

**Attachment A**  
**Program Proposal Application Form for Programs**  
**Preparing Licensed Professional Geologists**

- This form is also available on <http://www.highered.nysed.gov/ocue/aipr/profprogram.html>. Please complete this form for a new or existing program.
- Public institutions should use the appropriate SUNY/CUNY proposal submission forms and submit the proposal to the Central Administration of SUNY/CUNY. **This form should be submitted with the SUNY/CUNY forms.**
- Submit the application **electronically** to [opprogs@nysed.gov](mailto:opprogs@nysed.gov) **AND** mail one **hard copy** to the following address: Professional Education Program Review, Office of the Professions  
2nd Floor, West Wing, EB, New York State Education Department  
89 Washington Avenue  
Albany, NY 12234

**SECTION I. GENERAL INFORMATION**

**A.** Name of institution: Binghamton University

Specify campus where program will be offered, if other than the main campus:

**B.** CEO or designee

Name and title: Donald G. Nieman, Executive Vice President for Academic Affairs and Provost

**Signature and date:**

The signature of the institutional representative indicates the institution's commitment to support the proposed program.

**C.** Contact person, if different

Name and title: Donald Loewen, Vice Provost for Undergraduate Education and Enrollment Management

Telephone: 607-777-2142 Fax: 607-777-2288 E-mail: [djloewen@binghamton.edu](mailto:djloewen@binghamton.edu)

**D.** Indicate whether this is a new or existing program:     New             Existing Program

**E.** Proposed program title: N/A

**F.** Current program title (if applicable): Geological Sciences

**G.** Current/Proposed degree award: BS

**H.** Current/Proposed HEGIS code: 1914

**I.** SED Program Code of current program (if applicable): 03130

**J.** If the program would be offered jointly with another institution, identify the institution/branch below and attach a letter of agreement signed by that institution's CEO: N/A

**SECTION II. PROGRAM INFORMATION**

**A.** If the program has sought or will seek specialized accreditation, indicate

- i) Accrediting Group:
- ii) Date Accredited or Expected Date of Accreditation:

**B.** Anticipated maximum enrollment for new programs: N/A

1<sup>st</sup> yr: \_\_\_\_\_ 2<sup>nd</sup> yr: \_\_\_\_\_ 3<sup>rd</sup> yr: \_\_\_\_\_ 4<sup>th</sup> yr: \_\_\_\_\_ 5<sup>th</sup> yr: \_\_\_\_\_

**C.** Check all program scheduling and format features that apply: (See [definitions](#))

- i) **Format:**  Day  Evening  Weekend  Evening/Weekend  Not Full-Time
- ii) **Mode:**  Standard  Independent Study  External  Accelerated  
 Distance Education (submit [distance education application](#) with this proposal)
- iii) **Other:**  Bilingual  Language Other Than English Upper Division Program

**D. Program Requirements:** Provide a list of the program requirements as they will appear in the catalog. Be sure to distinguish between required and elective courses.

<b>Geology Track</b>	<b>Credits</b>
One 100-level GEOL course  <i>Note: Students pursuing the Transfer Path in Geology should fulfill this requirement by taking GEOL 111 Planet Earth</i>	4
GEOL 213 Historical Geology ( <b>SR</b> ) <b>-OR-</b> GEOL 301 Rock Record & Earth History ( <b>SR</b> )  <i>Note: Students pursuing the Transfer Path in Geology should fulfill this requirement by taking GEOL 213 Historical Geology</i>	4
GEOL 302 Introduction to Geophysics ( <b>SR</b> )	4
GEOL 303 Earth Materials ( <b>N</b> )	4
GEOL 304 Intro to Envi Geochemistry ( <b>N</b> )	4
GEOL 311 Earth's Surface Processes ( <b>SR</b> )	4
GEOL 344 Structural Geology ( <b>SR</b> )	4
GEOL 401 Field Experience ( <b>SR</b> )	4-6
Three additional 300- or 400-level GEOL courses	12
MATH 224 Differential Calculus	2
MATH 225 Integral Calculus	2
MATH 226 Integration Tech & Applications	2
MATH 227 Infinite Series	2
<ul style="list-style-type: none"> <li>• CHEM 107 Intro to Chem Principles I <i>and</i></li> <li>• CHEM 108 Intro to Chem Principles II</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• CHEM 111 Chemical Principles</li> </ul>	4-8
<ul style="list-style-type: none"> <li>• PHYS 121 General Physics I <i>and</i></li> <li>• PHYS 122 General Physics II</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• PHYS 131 General Physics I (Calc-based) <i>and</i></li> <li>• PHYS 132 General Physics II (Calc-Based)</li> </ul>	8
MATH 227 Infinite Series	2
<b>TOTAL</b>	<b>64-70</b>

<b>Geophysics Track</b>	<b>Credits</b>
One 100-level GEOL course	4
GEOL 301 Rock Record & Earth History ( <b>N</b> )	4
GEOL 302 Introduction to Geophysics ( <b>N</b> )	4
GEOL 303 Earth Materials ( <b>SR</b> )	4
GEOL 304 Intro to Envi Geochemistry ( <b>N</b> )	4
GEOL 401 Field Experience ( <b>SR</b> )	4-6
GEOL 450 Geophysics I ( <b>SR</b> )	4
<ul style="list-style-type: none"> <li>• CHEM 107 Intro to Chem Principles I <u>and</u></li> <li>• CHEM 108 Intro to Chem Principles II</li> </ul> <b>OR</b> <ul style="list-style-type: none"> <li>• CHEM 111 Chemical Principles</li> </ul>	4-8
MATH 224 Differential Calculus	2
MATH 225 Integral Calculus	2
MATH 226 Integration Techniques & Applications	2
MATH 227 Infinite Series	2
MATH 323 Calculus III	4
MATH 324 ODEs for Scientists/Engineers	4
<ul style="list-style-type: none"> <li>• PHYS 121 General Physics I <u>and</u></li> <li>• PHYS 122 General Physics II</li> </ul> <b>OR</b> <ul style="list-style-type: none"> <li>• PHYS 131 General Physics I (Calc-based) <u>and</u></li> <li>• PHYS 132 General Physics II (Calc-Based)</li> </ul>	8
PHYS 331 Electromagnetic Theory I ( <b>SR</b> )	4
PHYS 332 Electromagnetic Theory II ( <b>SR</b> )	4
PHYS 341 Analytical Mechanics ( <b>SR</b> )	4
One of the following GEOL courses: <ul style="list-style-type: none"> <li>• GEOL 344 Structural Geology (<b>SR</b>)</li> <li>• GEOL 416 Hydrogeology (<b>N</b>)</li> <li>• GEOL 453 Environmental Geophysics (<b>N</b>)</li> </ul>	4
<b>TOTAL</b>	<b>72-78</b>

<b>Environmental Geology Track</b>	<b>Credits</b>
One 100-level GEOL course	4
GEOL 301 Rock Record & Earth History ( <b>N</b> )	4
GEOL 302 Introduction to Geophysics ( <b>N</b> )	4
GEOL 303 Earth Materials ( <b>SR</b> )	4
GEOL 304 Intro to Envi Geochemistry ( <b>N</b> )	4
GEOL 311 Earth's Surface Processes ( <b>SR</b> )	4
GEOL 344 Structural Geology ( <b>SR</b> )	4
GEOL 401 Field Experience ( <b>SR</b> )	4-6
Three of the following upper-level GEOL courses in Environmental Geology: <ul style="list-style-type: none"> <li>• GEOL 342 Environmental Hydrology (<b>N</b>)</li> <li>• GEOL 414 Climate &amp; Paleoclimate (<b>N</b>)</li> <li>• GEOL 416 Hydrogeology (<b>N</b>)</li> <li>• GEOL 460 Geomicrobiology (<b>N</b>)</li> <li>• GEOL 465 Environmental Measurements (<b>N</b>)</li> <li>• GEOL 470 Geochemistry (<b>SR</b>)</li> </ul>	12
MATH 224 Differential Calculus	2
MATH 225 Integral Calculus	2
MATH 226 Integration Tech & Applications	2
MATH 227 Infinite Series	2
<ul style="list-style-type: none"> <li>• CHEM 107 Intro to Chem Principles I <i>and</i></li> <li>• CHEM 108 Intro to Chem Principles II</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• CHEM 111 Chemical Principles</li> </ul>	4-8
<ul style="list-style-type: none"> <li>• PHYS 121 General Physics I <i>and</i></li> <li>• PHYS 122 General Physics II</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• PHYS 131 General Physics I (Calc-based) <i>and</i></li> <li>• PHYS 132 General Physics II (Calc-Based)</li> </ul>	8
<b>TOTAL</b>	<b>64-70</b>

**E. Program Outline:** Provide a sample program, by year and session, illustrating how program and degree requirements can be satisfied.

## SUNY Undergraduate Sample Program Schedule

Campus Name

Binghamton University

Program/Track Title and Award

Geological Sciences/Geology B.S.

Calendar Type

Semester	Quarter	Trimester	Other
X			

SUNY Transfer Path Name (if one exists)

Geology

← Use Dropdown Arrow.

Use the table to show how a typical student may progress through the program. Check all columns that apply to a course or enter credits where applicable.

**KEY** Course Type: Required (R), Restricted Elective (RE), Free Elective (FE) Course Credits: Number of Credits for individual course (Enter number.) GER Area: SUNY General Education Requirement Area (Enter Area Abbreviation from the drop-down menu.) GER Credits: (Enter number of course credits.) LAS: Liberal Arts & Sciences Credits (Enter X if course is an LAS course.) Major: Major requirement (Enter X.) TPath: SUNY Transfer Path Major & Cognate Courses (Enter X.) Elective/Other: Electives or courses other than specified categories (Enter X.) Upper Div: Courses intended primarily for juniors and seniors outside of the major (Enter X.) Upper Div Major: Courses intended primarily for juniors and seniors within the major (Enter X.) New: new course (Enter X.) Co/Prerequisite(s): List co/prerequisite(s) for the noted courses. SUNY GER Area Abbreviations (the first five listed in order of their frequency of being required by SUNY campuses): Basic Communication (BC), Math (M), Natural Sciences (NS), Social Science (SS), Humanities (H), American History (AH), The Arts (AR), Other World Civilizations (OW), Western Civilization (WC), Foreign Language (FL).

The table will automatically update the number of credits, courses and categories in the program totals table at the bottom of the chart.

Label each term in sequence, consistent with the institution's academic calendar (e.g., Fall 1, Spring 1, Fall 2).

Term 1: Fall 1

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
CHEM 107 Intro to Chem Principles I (RE)	4			X	X				X		
MATH 224 Differential Calculus (R)	2	M	2	X	X				X		
MATH 225 Integral Calculus (R)	2	M	2	X	X				X		MATH 224
GE/LAS (RE)	4	BC	4	X							
GE/LAS (RE)	4	AR	4	X							
<b>Term Totals</b>	<b>16</b>	<b>4</b>	<b>12</b>	<b>16</b>	<b>8</b>				<b>3</b>		<b>(X)</b>

Term 2: Spring 1

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEOL 111 Planet Earth (or other 100-Level GEOL) (RE)	4	NS	4	X	X				X		
CHEM 108 Intro to Chem Principles II (RE)	4			X	X				X		CHEM 107
MATH 226 Integration Tech & Application (R)	2			X	X					X	MATH 225
MATH 227 Infinite Series (R)	2			X	X					X	MATH 226
GE/LAS (RE)	4	FL	4	X							
<b>Term Totals</b>	<b>16</b>	<b>2</b>	<b>8</b>	<b>16</b>	<b>12</b>				<b>2</b>	<b>2</b>	<b>(X)</b>

Term 3: Fall 2

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEOL 213 Histor Geol (or GEOL 301 Rock Record) (RE)	4			X	X				X	X	GEOL 111
PHYS 121 General Physics I (RE)	4			X	X						
GE/LAS (RE)	4	OW	4	X							
GE/LAS (RE)	4	AH	4	X							
<b>Term Totals</b>	<b>16</b>	<b>2</b>	<b>8</b>	<b>16</b>	<b>8</b>				<b>1</b>	<b>1</b>	<b>(X)</b>

Term 4: Spring 2

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEOL 303 Earth Materials (R)	4			X	X		X	X		X	100-level GEOL course
PHYS 122 General Physics II (RE)	4			X	X						PHYS 121
GE/LAS (RE)	4	H	4	X							
GE/LAS (RE)	4	SS	4	X							
<b>Term Totals</b>	<b>16</b>	<b>2</b>	<b>8</b>	<b>16</b>	<b>8</b>		<b>4</b>	<b>4</b>		<b>1</b>	<b>(X)</b>

Term 5: Fall 3											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEOL 302 Introduction to Geophysics (R)	4			X	X		X	X		X	100-level GEOL course
Upper Level GEOL Course (RE)	4			X	X		X	X			100-level GEOL course
Upper Level Elective (RE)	4					X	X				
Elective (FE)	4					X					
<b>Term Totals</b>	<b>16</b>			<b>8</b>	<b>8</b>	<b>8</b>	<b>12</b>	<b>8</b>		<b>1</b>	<b>(X)</b>

Term 6: Spring 3											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEOL 304 Intro to Envi Geochemistry (R)	4			X	X		X	X		X	100-level GEOL, CHEM 307 or 313
GEOL 311 Earth's Surface Processes (R)	4			X	X		X	X		X	GEOL 301 or 303, or ENVI 201
Upper Level Elective (RE)	4					X	X				
Elective (RE)	2					X					
<b>Term Totals</b>	<b>14</b>			<b>8</b>	<b>8</b>	<b>6</b>	<b>12</b>	<b>8</b>		<b>2</b>	<b>(X)</b>

Term 7: Fall 4											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEOL 401 Field Experience (R)	6			X	X		X	X		X	100-level GEOL course
GEOL 344 Structural Geology (R)	4			X	X		X	X		X	GEOL 302
Upper Level Elective (RE)	4					X	X				
Elective (FE)	2					X					
<b>Term Totals</b>	<b>16</b>			<b>10</b>	<b>10</b>	<b>6</b>	<b>14</b>	<b>10</b>		<b>2</b>	<b>(X)</b>

Term 8: Spring 4											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
Upper Level GEOL Course (RE)	4			X	X		X	X			
Upper Level GEOL Course (RE)	4			X	X		X	X			
Elective (FE)	4					X					
Elective (FE)	4					X					
<b>Term Totals</b>	<b>16</b>			<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>			<b>(X)</b>

Program Total Summary	Total Credits	SUNY GER Areas	SUNY GER Credits	Liberal Arts & Sciences Credits	Major Credits	Elective and Other Credits	Upper Division Credits	Upper Division Major Credits	Total TPath Courses	New Courses
	126	9	36	98	70	28	50	38	6	9
GER Area Summary										
		Basic Communication (BC)	1			The Arts (AR)	1			
		Mathematics (M)	2			American History (AH)	1			
		Natural Sciences (NS)	1			Western Civilization (WC)				
		Social Sciences (SS)	1			Other World Civilizations (OW)	1			
		Humanities (H)	1			Foreign Language (FL)	1			

### SUNY Undergraduate Sample Program Schedule

Campus Name

Binghamton University

Program/Track Title and Award

Geological Sciences/Geophysics B.S.

Calendar Type

Semester	Quarter	Trimester	Other
X			

SUNY Transfer Path Name (if one exists)

N/A

← Use Dropdown Arrow.

Use the table to show how a typical student may progress through the program. Check all columns that apply to a course or enter credits where applicable.

**KEY** Course Type: Required (R), Restricted Elective (RE), Free Elective (FE). Course Credits: Number of Credits for individual course (Enter number.) GER Area: SUNY General Education Requirement Area (Enter Area Abbreviation from the drop-down menu.) GER Credits: (Enter number of course credits.) LAS: Liberal Arts & Sciences Credits (Enter X if course is an LAS course.) Major: Major requirement (Enter X.) TPath: SUNY Transfer Path Major & Cognate Courses (Enter X.) Elective/Other: Electives or courses other than specified categories (Enter X.) Upper Div: Courses intended primarily for juniors and seniors outside of the major (Enter X.) Upper Div Major: Courses intended primarily for juniors and seniors within the major (Enter X.) New: new course (Enter X.) Co/Prerequisite(s): List co/prerequisite(s) for the noted courses. SUNY GER Area Abbreviations (the first five listed in order of their frequency of being required by SUNY campuses): Basic Communication (BC), Math (M), Natural Sciences (NS), Social Science (SS), Humanities (H), American History (AH), The Arts (AR), Other World Civilizations (OW), Western Civilization (WC), Foreign Language (FL).

The table will automatically update the number of credits, courses and categories in the program totals table at the bottom of the chart.

Label each term in sequence, consistent with the institution's academic calendar (e.g., Fall 1, Spring 1, Fall 2).

Term 1: Fall 1

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
CHEM 107 Intro to Chem Principles I (RE)	4			X	X						
MATH 224 Differential Calculus (R)	2	M	X	X	X						
MATH 225 Integral Calculus (R)	2	M	X	X	X						MATH 224
GE/LAS (RE)	4	BC	X	X							
GE/LAS (RE)	4	AR	X	X							
<b>Term Totals</b>	<b>16</b>	<b>4</b>	<b>12</b>	<b>16</b>	<b>8</b>						(X)

Term 2: Spring 1

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
100-Level GEOL Course (RE)	4	NS	X	X	X						
CHEM 108 Intro to Chem Principles II (RE)	4			X	X						CHEM 107
MATH 226 Infinite Series (R)	2			X	X					X	MATH 225
MATH 227 Linear Algebra (R)	2			X	X					X	MATH 226
GE/LAS (RE)	4	FL	X	X							
<b>Term Totals</b>	<b>16</b>	<b>2</b>	<b>8</b>	<b>16</b>	<b>12</b>					<b>2</b>	(X)

Term 3: Fall 2

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEOL 301 Rock Records & Earth History (R)	4			X	X		X	X		X	100-level GEOL course
PHYS 121 General Physics I (RE)	4			X	X						
GE/LAS (RE)	4	DW	X	X							
GE/LAS (RE)	4	AH	X	X							
<b>Term Totals</b>	<b>16</b>	<b>2</b>	<b>8</b>	<b>16</b>	<b>8</b>		<b>4</b>	<b>4</b>		<b>1</b>	(X)

Term 4: Spring 2

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
MATH 323 Calculus III (R)	4			X	X		X	X			MATH 227
PHYS 122 General Physics II (RE)	4			X	X						PHYS 121
GE/LAS (RE)	4	H	X	X							
GE/LAS (RE)	4	SS	X	X							
<b>Term Totals</b>	<b>16</b>	<b>2</b>	<b>8</b>	<b>16</b>	<b>8</b>		<b>4</b>	<b>4</b>			(X)



Term 5: Fall 3											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEO 302 Intro to Geophysics (R)	4			X	X		X	X		X	100-level GEO course
MATH 324 ODE's for Scientists/Engineers (R)	4			X	X		X	X			MATH 227
PHYS 331 Electromagnetic Theory I (R)	4			X	X		X	X		X	PHYS 122, MATH 323
Elective (FE)	4					X					
<b>Term Totals</b>	<b>16</b>			<b>12</b>	<b>12</b>	<b>4</b>	<b>12</b>	<b>12</b>		<b>2</b>	<b>(X)</b>

Term 6: Spring 3											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEO 303 Earth Materials (R)	4			X	X		X	X		X	100-level GEO course
GEO 304 Intro to Envi Geochemistry (R)	4			X	X		X	X		X	200-level GEO; CHEM 107 or 111
PHYS 332 Electromagnetic Theory II (R)	4			X	X		X	X		X	PHYS 331
Elective (RE)	2					X					
<b>Term Totals</b>	<b>14</b>			<b>12</b>	<b>12</b>	<b>2</b>	<b>12</b>	<b>12</b>		<b>3</b>	<b>(X)</b>

Term 7: Fall 4											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEO 401 Field Experience (R)	6			X	X		X	X		X	100-level GEO course
GEO 430 Geophysics I (R)	4			X	X		X	X		X	MATH 225, PHYS 121 or 131, GEO 302
Upper Level Elective (RE)	4					X	X				
Elective (FE)	2					X					
<b>Term Totals</b>	<b>16</b>			<b>10</b>	<b>10</b>	<b>6</b>	<b>14</b>	<b>10</b>		<b>2</b>	<b>(X)</b>

Term 8: Spring 4											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEO Structural, Hydro, or Envi Geophys (RE)	4			X	X		X	X		X	
PHYS 341 Analytical Mechanics (R)	4			X	X		X	X		X	PHYS 122, 323, MATH 324
Elective (FE)	4					X					
Elective (FE)	4					X					
<b>Term Totals</b>	<b>16</b>			<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>		<b>2</b>	<b>(X)</b>

**Program Total Summary**

Total Credits	SUNY GER Areas	SUNY GER Credits	Liberal Arts & Sciences Credits	Major Credits	Elective and Other Credits	Upper Division Credits	Upper Division Major Credits	Total TPath Courses	New Courses
126	9	36	106	78	20	54	50		12

**GER Area Summary**

Basic Communication (BC)	1	The Arts (AR)	1
Mathematics (M)	2	American History (AH)	1
Natural Sciences (NS)	1	Western Civilization (WC)	
Social Sciences (SS)	1	Other World Civilizations (OW)	1
Humanities (H)	1	Foreign Language (FL)	1

### SUNY Undergraduate Sample Program Schedule

Campus Name

Binghamton University

Program/Track Title and Award

Geological Sciences/Environmental Geology B.S.

Calendar Type

Semester	Quarter	Trimester	Other
X			

SUNY Transfer Path Name (if one exists)

N/A

←---- Use Dropdown Arrow.

Use the table to show how a typical student may progress through the program. Check all columns that apply to a course or enter credits where applicable.

**KEY** Course Type: Required (R), Restricted Elective (RE), Free Elective (FE). Course Credits: Number of Credits for individual course (Enter number.) GER Area: SUNY General Education Requirement Area (Enter Area Abbreviation from the drop-down menu.) GER Credits: (Enter number of course credits.) LAS: Liberal Arts & Sciences Credits (Enter X if course is an LAS course.) Major: Major requirement (Enter X.) TPath: SUNY Transfer Path Major & Cognate Courses (Enter X.) Elective/Other: Electives or courses other than specified categories (Enter X.) Upper Div: Courses intended primarily for juniors and seniors outside of the major (Enter X.) Upper Div Major: Courses intended primarily for juniors and seniors within the major (Enter X.) New: new course (Enter X.) Co/Prerequisite(s): List co/prerequisite(s) for the noted courses. SUNY GER Area Abbreviations (the first five listed in order of their frequency of being required by SUNY campuses): Basic Communication (BC), Math (M), Natural Sciences (NS), Social Science (SS), Humanities (H), American History (AH), The Arts (AR), Other World Civilizations (OW), Western Civilization (WC), Foreign Language (FL).

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Label each term in sequence, consistent with the institution's academic calendar (e.g., Fall 1, Spring 1, Fall 2).

**Term 1: Fall 1**

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
CHEM 107 Intro to Chem Principles I (RE)	4			X	X						
MATH 224 Differential Calculus (R)	2	M	2	X	X						
MATH 225 Integral Calculus (R)	2	M	2	X	X						MATH 224
GE/LAS (RE)	4	BC	4	X							
GE/LAS (RE)	4	AR	4	X							
<b>Term Totals</b>	<b>16</b>	<b>4</b>	<b>12</b>	<b>16</b>	<b>8</b>						<b>(X)</b>

**Term 2: Spring 1**

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
100-Level GEOL Course (RE)	4	NS	4	X	X						
CHEM 108 Intro Chem Principles II (RE)	4			X	X						CHEM 107
MATH 226 Infinite Series (R)	2			X	X					X	MATH 225
MATH 227 Linear Algebra (R)	2			X	X					X	MATH 226
GE/LAS (RE)	4	FL	4	X							
<b>Term Totals</b>	<b>16</b>	<b>2</b>	<b>8</b>	<b>16</b>	<b>12</b>					<b>2</b>	<b>(X)</b>

**Term 3: Fall 2**

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEOL 301 Rock Record & Earth History (R)	4			X	X		X	X		X	100-level GEOL course
PHYS 121 General Physics I (RE)	4			X	X						
GE/LAS (RE)	4	OW	X	X							
GE/LAS (RE)	4	AH	X	X							
<b>Term Totals</b>	<b>16</b>	<b>2</b>	<b>8</b>	<b>16</b>	<b>8</b>		<b>4</b>	<b>4</b>		<b>1</b>	<b>(X)</b>

**Term 4: Spring 2**

Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEOL 303 Earth Materials (R)	4			X	X		X	X		X	100-level GEOL course
PHYS 122 General Physics II (RE)	4			X	X						PHYS 121
GE/LAS (RE)	4	H	X	X							
GE/LAS (RE)	4	SS	X	X							
<b>Term Totals</b>	<b>16</b>	<b>2</b>	<b>8</b>	<b>16</b>	<b>8</b>		<b>4</b>	<b>4</b>		<b>1</b>	<b>(X)</b>

Term 5: Fall 3											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEO 302 Intro to Geophysics (R)	4			X	X		X	X		X	100-level GEOL course
Upper Level Environmental GEOL Course (RE)	4			X	X		X	X		X	
Upper Level Elective (RE)	4					X	X				
Elective (FE)	4					X					
<b>Term Totals</b>	<b>16</b>			<b>8</b>	<b>8</b>	<b>8</b>	<b>12</b>	<b>8</b>		<b>2</b>	<b>(X)</b>

Term 6: Spring 3											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEO 304 Intro to Envi Geochemistry (R)	4			X	X		X	X		X	100-level GEOL, CHEM 107 or 111
GEO 311 Earth's Surface Processes (R)	4			X	X		X	X		X	GEOL 301 or 303, or ENVI 201
Upper Level Elective (RE)	4					X	X				
Elective (FE)	2					X					
<b>Term Totals</b>	<b>14</b>			<b>8</b>	<b>8</b>	<b>6</b>	<b>12</b>	<b>8</b>		<b>2</b>	<b>(X)</b>

Term 7: Fall 4											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
GEO 401 Field Experience (R)	6			X	X		X	X		X	100-level GEOL course
GEO 344 Structural Geology (R)	4			X	X		X	X		X	GEOL 302
Upper Level Elective (RE)	4					X	X				
Elective (FE)	2					X					
<b>Term Totals</b>	<b>16</b>			<b>10</b>	<b>10</b>	<b>6</b>	<b>14</b>	<b>10</b>		<b>2</b>	<b>(X)</b>

Term 8: Spring 4											
Course Number & Title (& Type)	Number of Credits	GER Area	GE Credits	LAS	Major	Elective/Other	Upper Div	Upper Div Major	TPath	New Course	Co/Prerequisite
Upper Level Environmental GEOL Course (RE)	4			X	X		X	X		X	
Upper Level Environmental GEOL Course (RE)	4			X	X		X	X		X	
Elective (FE)	4					X					
Elective (FE)	4					X					
<b>Term Totals</b>	<b>16</b>			<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>		<b>2</b>	<b>(X)</b>

**Program Total Summary**

Total Credits	SUNY GER Areas	SUNY GER Credits	Liberal Arts & Sciences Credits	Major Credits	Elective and Other Credits	Upper Division Credits	Upper Division Major Credits	Total TPath Courses	New Courses
126	9	36	98	70	28	54	42		12

**GER Area Summary**

Basic Communication (BC)	1	The Arts (AR)	1
Mathematics (M)	2	American History (AH)	1
Natural Sciences (NS)	1	Western Civilization (WC)	
Social Sciences (SS)	1	Other World Civilizations (OW)	1
Humanities (H)	1	Foreign Language (FL)	1

**F. Only applicable to new programs:** Provide information on admission and retention standards and resources available to support the program.

**SECTION III. CURRICULUM.** Please use the content chart to indicate how the proposed program meets the content requirements. Submit a Course Syllabus or outline for each listed course as well as a Curriculum Vitae for each instructor.

## Content Chart

Content Requirements	Course(s) Number and Title Meeting the Content Area Requirements	C r e d i t s	Req u i r e d o 	Name of Instructors	Indicate Faculty Status (Full or Part Time)
<b>I. MATHEMATICS AND PHYSICAL SCIENCES</b>					
a. mathematics (at least 6 semester hours)	MATH 224, Differential Calculus	2	Req.	L. William Kazmierczak	Full time
	MATH 225, Integral Calculus	2	Req.	L. William Kazmierczak	Full time
	MATH 226, Integration Techniques & Application	2	Req.	Carlos A Vega	Full time
	MATH 227, Infinite Series	2	Req.	Carlos A Vega	Full time
b. sciences (at least 15 semester hours in at least two of the following areas)					
(i) Physics	PHYS 121 General Physics I	4	Req.	Jonathon W. Nale, Erik M. Weiler	Part time
	PHYS 122 General Physics II	4	Req.	Jonathon W. Nale, Erik M. Weiler	Part time
(ii) Chemistry	CHEM 107 Intro. Chem. Principles I	4	Req.	Benjamin W. Turnpenny, Steven C. Murphy	Full time
	CHEM 108 Intro. Chem. Principles II	4	Req.	Benjamin W. Turnpenny, Steven C. Murphy	Full time
(iii) Biology					
<b>II. GEOLOGY SCIENCE (a minimum of 30 semester hours)</b>					
a. 24 of the 30 semester hours must be in the following areas, including at least 1 course in 4 of the 8 areas.					
(i) Earth Materials (12 credits)	GEOL 303 Earth Materials	4	Req.	David M. Jenkins	Full time
	GEOL 304 Intro to Envi. Geochem	4	Req.	Joseph R Graney	Full time
	GEOL 423 Ig. & Meta. Petrology	4	Elec.	H. Richard Naslund	Full Time
	GEOL 470 Geochemistry	4	Elec.	Tim K. Lowenstein	Full Time
(ii) Sedimentary Geology (8 credits)	GEOL 213 Historical Geology	4	Elec.	H. Richard Naslund	Full time
	GEOL 301 Rock Record and Earth History	4	Req.	H. Richard Naslund	Full time
	GEOL 366 Paleobiology	4	Elec.	Thomas Kulp	Full time

	GEOL 415 Basin Analysis	4	Elec.	Jeffrey T. Pietras	Full time
	GEOL 436 Sedimentary Envi. & Facies	4	Elec.	Tim K. Lowenstein	Full time
(iii) Geotechnology	-----	-----	-----	-----	-----
(iv) Surficial and Near-Surface Geology (4 credits)	GEOL 311 Earth's Surface Processes	4	Req.	Peter L. Knuepfer	Full time
(v) Hydrogeology (4 credits)	GEOL 342 Environ. Hydrology	4	Elec.	Joseph R. Graney	Full time
	GEOL 416 Hydrogeology	4	Elec.	To Be Hired	Search in progress
(vi) Geodynamics (12 credits)	GEOL 302 Intro. Geophysics	4	Req.	Alex Nikulin	Full time
	GEOL 344 Structural Geology	4	Req.	Jeffrey T. Pietras	Full time
	GEOL 450 Geophysics I	4	Req.	Alex Nikulin	Full time
(vii) Economic Geology (4 credits)	GEOL 326 Nonrenewable Nat. Resources	4	Elec.	H. Richard Naslund	Full time
(viii) Geological Skills/Applications	GEOL 401 Field Experience	4-6	Req.	Peter L. Knuepfer	Full time
	GEOL 455 Applied Spatial Analysis	4	Elec.	Jeffrey Pietras	Full time
a. Total semester hours = 72-74					
b. If applicable, specify the other coursework that meet the 30 semester-hour requirement.					
Specify the area(s):					
Introductory planetary geology	GEOL 102 Geol. Solar System	4	Elec.	David M. Jenkins	Full time
Introductory physical geology	GEOL 111 Planet Earth	4	Elec.	H Richard Naslund	Full time
Introductory oceanography	GEOL 112 Intro. Oceanography	4	Elec.	Molly Patterson	Full time
Introductory paleoclimate	GEOL 115 Global Change: Geological Perspective	4	Elec.	Molly Patterson	Full time
Natural hazards	GEOL 116 Geological Hazards	4	Elec.	Peter Knuepfer	Full time
Biogeochemistry	GEOL 234 Biogeochem. Pt. I	4	Elec.	Jon Schmitkons	Full time
Soil ecology	GEOL 328 Soils:Life & Death Underfoot	4	Elec.	George Meindl	Full time
Biogeochemistry	GEOL 334 Biogeochem Pt. II	4	Elec.	Jon Schmitkons	Full time
Paleoclimatology	GEOL 414 Climate & Paleoclimate	4	Elec.	Molly Patterson	Full time
Environmental geophysics	GEOL 453 Envi Geophysics	4	Elec.	Alex Nikulin	Full time
Geomicrobiology	GEOL 460 Geomicrobiology	4	Elec.	Thomas Kulp	Full time

Environmental geochemistry	GEOL 465 Envi. Measurements	4	Elec.	Joseph Graney	Full time
Independent study	GEOL 497 Ind. Work	1-4	Elec.	Variable	Full Time

**Note: Submit a Course Syllabus or outline for each listed course as well as a Curriculum Vitae for each instructor.**

## **Appendix A: Course Syllabi, Geological Sciences**



## Appendix B: Curriculum Vitae of Listed-Course Instructors, Geological Sciences

<u>Faculty member</u>	<u>page</u>
Joseph R. Graney .....	19
David M. Jenkins .....	21
Lawrence William Kazmierczak.....	23
Peter L. K. Knuepfer.....	28
Thomas R. Kulp.....	30
Tim K. Lowenstein .....	33
George A. Meindl .....	35
Steven Murphy.....	37
Jon Nale .....	40
H. Richard Naslund.....	43
Alex Nikulin.....	45
Molly O. Patterson .....	48
Jeffrey T. Pietras .....	51
Jonathan P. Schmitkons .....	54
Benjamin Turnpenny .....	57

Carlos Vega.....63

Erik Weiler.....67

## BIOGRAPHICAL SKETCH FOR PROFESSOR JOSEPH GRANEY

Department of Geological Sciences and Environmental Studies  
P.O. Box 6000  
Binghamton, NY 13902-6000

607-777-6347 (ph)  
607-777-2288 (fax)  
jgraney@binghamton.edu

### PROFESSIONAL PREPARATION

Undergraduate:	University of Wisconsin-Platteville	Geology, BS 1980 ( <i>summa cum laude</i> )
Graduate:	University of Nevada-Reno	Geology, MS 1985
Graduate:	The University of Michigan-Ann Arbor	Geology, PhD 1994
Postdoctoral:	The University of Michigan -Ann Arbor	Environmental Health Sci. 1994-1997

### APPOINTMENTS

Sep 2015 to present	<b>Binghamton University</b> , Binghamton, NY Professor, Department of Geological Sciences and Environmental Studies
Jul 2013 to Aug 2015	<b>Binghamton University</b> , Binghamton, NY Program Director, Environmental Studies
Sep 2012 to Aug 2015	<b>Binghamton University</b> , Binghamton, NY Chair, Department of Geological Sciences and Environmental Studies
Aug 2005 to Aug 2006	<b>U.S. Environmental Research Agency</b> , Research Triangle Park, NC Visiting Scientist, through a formal Intergovernmental Personnel Assignment
Jul 2004 to present	<b>Binghamton University</b> , Binghamton, NY: Associate Director, Center for Integrated Watershed Studies
Jan 2004 to Aug 2015	<b>Binghamton University</b> , Binghamton, NY: Associate Professor of Geological Sciences and Environmental Studies.
Jan 1998 to Dec 2003	<b>Binghamton University</b> , Binghamton, NY: Assistant Professor of Geological Sciences and Environmental Studies.

### RESEARCH AND TEACHING INTERESTS: ENVIRONMENTAL GEOCHEMISTRY

My research and teaching melds field and laboratory work. My approach entails collection of samples on multiple spatial and temporal scales, coupled with analysis using modern analytical techniques, to trace natural and anthropogenic geochemical processes. My research foci is coupling atmospheric deposition with surface water hydrology and geochemistry, often from a watershed based perspective. Many of my projects are interdisciplinary and are coordinated through the Center for Integrated Watershed Studies at Binghamton University. Current research includes assessing i) ecosystem impacts adjacent to oil sands production facilities in Alberta; ii) energy resource development on Chesapeake Bay watersheds; and (iii) the impact of interstate and local roadway infrastructure on surface and groundwater resources.

I presently offer courses in Environmental Hydrology, Environmental Geochemistry, and Environmental Measurements at Binghamton University.

### REPRESENTATIVE RECENT PUBLICATIONS (including \*student authors)

**Graney, J.R.**, Edgerton, E.S., Landis, M.S., 2019. Using Pb isotope ratios of particulate matter and epiphytic lichens from the Athabasca Oil Sands Region in Alberta, Canada to quantify local, regional, and global Pb source contributions. *Sci. Total Environ.*, 654:1293-1304.

Landis, M.S., Studebaker, W., Pancras, J.P., **Graney, J.R.**, White E.M., 2019. Receptor modeling of an epiphytic lichen bioindicator to elucidate the sources and spatial distribution of polycyclic aromatic hydrocarbons in the Athabasca Oil Sands Region. *Sci Total Environ.*, 654:1241-1257.

Joseph R. Graney (continued)

Landis, M.S., Studebaker, W., Pancras, J.P., **Graney, J.R.**, White E.M., Edgerton, E.S. 2019. Source apportionment of ambient fine and coarse particulate matter polycyclic aromatic hydrocarbons at the Bertha Ganter-Fort McKay community site in the Oil Sands Region of Alberta, Canada. *Sci Total Environ.*, 666: 540-558.

**Graney, J.R.**, Landis, M.S., Puckett, K.J., Studabaker, W.B., Edgerton, E.S., Legge, A.H., Percy, K.E. (2017) Differential accumulation of PAHs, elements, and Pb isotopes by five lichen species from the Athabasca Oil Sands Region in Alberta, Canada. *Chemosphere*, v. 184, 700-710.

M.S. Landis, Pancras, J.P., **Graney, J.R.**, White, E.M., Edgerton, E.S., Legge, A., Percy, K.E. (2017) Source apportionment of ambient fine and coarse particulate matter at the Fort McKay community site, in the Athabasca Oil Sands Region, Alberta, Canada. *Science of the Total Environment*, v. 584, 105-117.

\*Johnson, J.D., **Graney, J.R.**, Capo, R.C., Stewart, B.W. (2015). Identification and quantification of basin brine and road salt sources in watersheds along the New York / Pennsylvania border, USA. *Applied Geochemistry*. v.60, 37-50.

\*Johnson, J.D., **Graney, J.R.**, (2015). Fingerprinting Marcellus Shale waste products from Pb isotope and trace metal perspectives. *Applied Geochemistry* v.60, 104-155.

Phan, T.T., Capo, R.C., Stewart, B.W., **Graney, J.R.**, \*Johnson, J.D., Sharma, S., Toro, J. (2015). Trace metal distribution and mobility in drill cuttings and produced waters from Marcellus shale gas extraction: uranium, arsenic, barium. *Applied Geochemistry*. v.60, 89-103.

**Graney, J.R.** and Landis, M.S. (2013) Coupling meteorology, metal concentrations and Pb isotopes for source attribution in archived precipitation samples, *Science of the Total Environment* v. 448: 141-150.

Stewart, B.W., \*Chapman, E.C., Capo, R.C., \*Johnson, J.D., **Graney, J.R.**, Kirby, C.S., Schroeder, K.T. (2015). Origin of brines, salts and carbonate from shales of the Marcellus Formation: Evidence from geochemical and Sr isotope study of sequentially extracted fluids. *Applied Geochemistry*. v.60, 78-88.

\*Kearney MA, Zhu W, **Graney J.** (2013) Inorganic nitrogen dynamics in an urban constructed wetland under base-flow and storm-flow conditions. *Ecological Engineering* 60: 183-191.

**Graney, J.R.** and Landis, M.S. (2013) Coupling meteorology, metal concentrations and Pb isotopes for source attribution in archived precipitation samples, *Science of the Total Environment* 448: 141-150.

## SYNERGISTIC ACTIVITIES

- 1) Member of the Scientific Support Group for the Upper Susquehanna Coalition
- 2) Associate Director and founding member of the Center for Integrated Watershed Studies (CIWS).
- 3) Member of the Sustainable Communities TAE and Committee for the University Environment
- 4) Ongoing collaborations with the EPA National Exposure Research Laboratory
- 5) 2005 Chancellor's Award for Excellence in Teaching

**THESIS ADVISOR:** 14 completed graduate student projects (2 others in progress) 1) Karajaberlian, Suzanne. M.A. 2001 (Corning Inc); 2) Eriksen, Timothy. M.A 2002 (Envi. Consulting); 3) Santiago, Abigail. M.A. 2002 (Analytical Chemist); 4) Wood, Erin. M.A. 2004 (SUNY-Broome); 5) Garrett, Karen. M.A. 2004 (BOCES); 6) Hunsinger, Glendon. M.A./PhD. 2004/2009 (Envi Consulting); 7) McCann, John. M.S. 2012 (USFS Hydrologist); 8) Johnson, Jason. PhD. 2014 (NYS DEC); 9) Gridley, Stephen. M.S. 2015 (Envi. Consulting); 10) Smith, Mikki. M.S. 2015 (Earth Science Educator); 11) Nelson, Kristina. M.S. 2016 (Analytical Chemist); 12) Lord, Danielle. M.S. 2016 (Watershed Specialist); 13) Schmitkons, Jonathan. Ph.D. 2016 (Research Assistant Professor- Binghamton University); 14) Saba, David (Hydrologist).

## David M. Jenkins

### Curriculum Vitae

Department of Geological Sciences and Environmental Studies  
Binghamton University  
Binghamton, NY 13902-6000

#### Professional Preparation:

Pennsylvania State University	Geological Sciences	B.S., 1972-1976
University of Chicago	Geological Sciences	Ph.D., 1976-1980
Arizona State University	Chemistry	Post-Doc, 1980-1981
University of Chicago	Geological Sciences	Post-Doc, 1981-1984

#### Appointments:

2010	Visiting Scholar, Univ. of Cambridge, Cambridge, United Kingdom
2002	Visiting Professor, Univ. of Alberta, Edmonton, Alberta, Canada
1998-present	Professor, Binghamton Univ. (SUNY)
1991-1998	Associate Professor, Binghamton Univ. (SUNY)
1991	Visiting Researcher, Univ. of Manitoba, Winnipeg, Manitoba, Canada
1984-1991	Assistant Professor, Binghamton Univ.

#### Awards:

2019 Honorary Award, American Federation of Mineralogical Societies  
2016 Hawley Medal, Mineralogical Association of Canada, Canadian Mineralogist, 2016 Best Paper Award  
2004 Chancellor's Award for Excellence in Scholarship and Creative Activities, State University of New York at Binghamton  
2001 Fellow, Mineralogical Society of America

#### Professional Associations:

Mineralogical Society of America, 1977-present  
American Geophysical Union, 1986-present  
Geochemical Society, 2001-present  
American Association for the Advancement of Science, 2017-present

#### PROFESSIONAL SERVICE:

Mineralogical Society of America Distinguished Lecturer Administrator, 2019-  
Hawley Medal Selection Committee – Mineral. Assoc. Canada, 2018  
Candidate for Vice-president, Min. Soc. Amer., 2009  
Secretary of the Mineralogical Society of America, 2000-2003  
Associate Editor for American Mineralogist, 1995-1999  
Member: Mineralogical Soc. of America Visiting Lecturer Committee, 1997-1999  
Member: Mineralogical Soc. of America Best Paper Award Committee, 1998

David M. Jenkins (continued)

**GRANTS (last 10 years):**

- 2006-2009 National Science Foundation, Research Grant; \$181,068 ; Title: "Experimental Investigation of the Blueschist to Greenschist Facies Transition"
- 2010-2013 National Science Foundation, Research Grant; \$254,155; Title: "Experimental Investigation of Glaucophane Solid Solution with Several Calcic Amphiboles"
- 2014-2017 National Science Foundation, Research Grant; \$264,672; Title: "Experimental Investigation of Chlorine Substitution into Calcic Amphiboles"
- 2017-2020 National Science Foundation, Research Grant; \$289,112; Title: "Stability and Thermochemistry of some Chlorine-bearing Calcium Amphiboles"

**Publications (last 5 years):**

- Huang, Y., Lin, Y.-C., Jenkins, D. M., Chernova, N. A., Chung, Y., Radhakrishnan, B.; Chu, I-H., Fang, J., Wang, Q., Omenya, F., Ong, S. P., Whittingham, M. S. (2016) Thermal stability and reactivity of cathode materials for Li-ion batteries. *ACS Applied Materials & Interfaces*, 8 (11), 7013–7021. DOI: 10.1021/acsami.5b12081.
- Holsing, N. A., and Jenkins, D. M. (2016) Gasket temperature: an alternate technique for estimating sample temperature in a multi-anvil apparatus. *High Pressure Research*, 36, 557-563. DOI:10.1080/08957959.2016.1177045
- Chan, A., Jenkins, D. M., and Dyar, M. D. (2016) Partitioning of chlorine between NaCl brines and ferro-pargasite: Implications for the formation of chlorine-rich amphiboles in mafic rocks. *Canadian Mineralogist*, 54, 337-351.
- Mueller, B. L., Jenkins, D. M., and Dyar, M. D. (2017) Chlorine incorporation in amphiboles synthesized along the magnesio-hastingsite–hastingsite compositional join. *European Journal of Mineralogy*, 29, 167-180.
- Campanaro, B. P., and Jenkins, D. M. (2017) An experimental study of chlorine incorporation in amphibole synthesized along the pargasite–ferro-pargasite join. *Canadian Mineralogist*, 55, 419-436.
- Almeida, K. M. F., and Jenkins, D. M. (2017) Stability field of the Cl-rich scapolite marialite. *American Mineralogist*, 102, 2484-2493.
- Jenkins, D. M., Holmes, Z. F., Ishida, K., and Manuel, P. D. (2018) Autocorrelation analysis of the infrared spectra of synthetic and biogenic carbonates along the calcite–dolomite join. *Physics and Chemistry of Minerals*, 45(6), 563-574.
- Jenkins, D. M. (2019) The incorporation of chlorine into calcium amphibole. *American Mineralogist*, 104, 514-524.
- Cheng, N., Jenkins, D. M., and Holland, T. J. B. (2019) Low-pressure-temperature stability of pyrope + quartz relative to orthopyroxene + kyanite: a new model for aluminous orthopyroxene with vacancies. *Contributions to Mineralogy and Petrology*, 174, article 30, doi.org/10.1007/s00410-019-1567-5.
- Almeida, K. M. F. and Jenkins, D. M. (2019) A comparison between the stability field of a Cl-rich scapolite and the end-member marialite. *American Mineralogist*, 104 (in press)

Curriculum Vitae  
**Lawrence William Kazmierczak**

4240 Reonole Dr.  
Binghamton, NY 13903 (551) 655-6079  
kaz@math.binghamton.edu

---

**EDUCATION**

**Ph.D. in Mathematics**, 2003, Stevens Institute of Technology, Hoboken, NJ Dissertation:  
“On the Relationship between Connectivity and Component Order Connectivity”  
Advisor: Charles Suffel

**M.S. in Mathematics**, 1993, Stevens Institute of Technology, Hoboken, NJ  
Concentration: Probability & Statistics

**B.S. in Math/Physics**, 1991, Albright College, Reading, PA

**ACADEMIC  
APPOINTMENTS**

Binghamton University, Binghamton, NY  
**Director of Calculus**, 2014-present

Stevens Institute of Technology, Hoboken, NJ Teaching  
Assistant Professor, 2011-2014

Stevens Institute of Technology  
Visiting Assistant Professor, 2002 –2011

Stevens Institute of Technology  
Adjunct Professor, 1999 – 2002

**HONORS**

Harry N. Davis Distinguished Teaching Assistant Professor Award, Stevens  
Institute of Technology, 2013, (\$2,500)

Edwin “Doc” Farrell Award, Athletics Dept., Stevens Institute of Technology,  
2013

Most Caring Professor Award (voted on by student body), Stevens-Faculty  
Alliance, Stevens Institute of Technology, 2011

Max Klimkeit Award, Athletics Dept., Stevens Institute of Technology, 2006

Outstanding Teaching Assistant Award, Dept. of Mathematics, Stevens Institute of  
Technology, 1999, (\$500)

Dean of the Graduate School Award, Graduate Academics, Stevens  
Institute of Technology, 1998, (\$500)

**TEACHING  
EXPERIENCE**

**Graduate courses taught in the Department of Mathematical Sciences:**

Teaching College Mathematics (5 semesters) Complex  
Analysis (3 semesters)  
Advanced Calculus I (3 semesters) Advanced  
Calculus II (3 semesters)  
Introduction to Probability Theory (3 semesters) Real  
Variables I (1 semester)  
Real Variables II (1 semester)

**Graduate courses taught in the Department of Electrical & Computer  
Engineering:**

Linear Systems Theory (3 semesters)  
Analytic Methods in Electrical Engineering (2 semesters) Applied  
Discrete Mathematics (1 semester)

**Undergraduate courses taught in the Department of Mathematical Sciences:**

Calculus I (17 semesters, course coordinator) Calculus II  
(16 semesters, course coordinator)  
Calculus I for Winter Intersession (first to develop course) Introduction  
to Mathematical Analysis (3 semesters)  
Real Variables (3 semesters) Complex  
Analysis (3 semesters)  
Probability & Statistics (3 semesters) Linear  
Algebra (3 semesters)  
Discrete Mathematics (3 semesters)  
Probability & Statistics (3 semesters) Seminar in  
Graph Theory (1 semester)

**Online courses taught:**

Calculus I (10 semesters) Precalculus  
(8 semesters)

**Ph.D. advising:**

Co-Chair advisor for Kristi Luttrell  
Dissertation: “On the Neighbor-Component Order Connectivity Model of Graph  
Theoretic Networks” (2013)

Member of dissertation committee for Lakshmi Iswara Chandra Vidyasagar Dissertation:  
“On Component Order Edge Connectivity and Component Order Edge Reliability”  
(2013)

Member of dissertation committee for Antonius Suhartomo Dissertation:  
“Component Order Edge Connectivity: A Vulnerability Parameter for  
Communication Networks” (2007)

**RESEARCH  
INTERESTS**

Graph theory, network vulnerability, network reliability, combinatorics, mathematics



education

D. Gross, **L. W. Kazmierczak**, J. Saccoman, C. Suffel, A. Suhartomo, On Component Edge Connectivity of a Complete Bipartite Graph, *Ars Combinatoria*, vol. 112, (2013) pp. 433-448.

D. Gross, M. Heinig, L. Iswara, **L. W. Kazmierczak**, K. Luttrell, J. T. Saccoman, C. Suffel, A Survey of Component Order Connectivity Models of Graph Theoretic Networks, *WSEAS Transactions on Mathematics*, vol. 12, issue 9, (2013) pp. 895-910.

D. Gross, L. Iswara, **L. W. Kazmierczak**, K. Luttrell, J. T. Saccoman, C. Suffel, On Component Order Edge Reliability and the Existence of Uniformly Most Reliable Unicycles, *WSEAS Transactions on Mathematics*, vol. 12, issue 9, (2013) pp. 873-883.

D. Gross, L. Iswara, **L. W. Kazmierczak**, J. T. Saccoman, C. Suffel, Optimization Results for Reliability Models, *Graph Theory Notes LXV of the Mathematical Association of America*, (2013) pp. 43-54.

K. Luttrell, L. Iswara, **L. W. Kazmierczak**, C. Suffel, D. Gross, J. T. Saccoman, The Relationship Between Neighbor-Connectivity, Component Connectivity, and Neighbor-Component Order Connectivity, *Congressus Numerantium*, vol. 212, (2012) pp. 15-30.

L. Iswara, **L. W. Kazmierczak**, K. Luttrell, C. Suffel, D. Gross, J. T. Saccoman, On Component Order Edge Reliability and Uniform Optimality, *Congressus Numerantium*, vol. 212, (2012) pp. 65-76.

L. Iswara, **L. W. Kazmierczak**, K. Luttrell, C. Suffel, D. Gross, J. T. Saccoman, Weighted Component Edge Connectivity of Trees and Unicycles II, *Congressus Numerantium*, vol. 208, (2011) pp. 33-54.

L. Iswara Chandra, D. Gross, **L. W. Kazmierczak**, J. T. Saccoman, A. Suhartomo, C. Suffel, On Weighted Component Edge Connectivity of Trees and Unicycles, *Congressus Numerantium*, vol. 206, (2010) pp. 85-97.

F. Boesch, D. Gross, **L.W. Kazmierczak**, J.T. Saccoman, C. Suffel, A. Suhartomo, A Generalization of an Edge-Connectivity Theorem of Chartrand, *Networks*, vol. 54, issue 2, (Sept. 2009) pp. 82-89.

**L. W. Kazmierczak**, F. Boesch, D. Gross, C. Suffel, A. Suhartomo, Bounds for the Component Order Edge Connectivity, *Congressus Numerantium*, vol. 185, (2007) pp. 159-171. **L. W. Kazmierczak**, F. Boesch, D. Gross, C. Suffel, Realizability Results Involving Two Connectivity Parameters, *Ars Combinatoria*, vol. 82, (2007) pp. 181-191.

F. Boesch, D. Gross, **L. W. Kazmierczak**, C. Suffel, A. Suhartomo, Component Order Edge Connectivity - An Introduction, *Congressus Numerantium*, vol. 178, (2006) pp. 7-14.

**L. W. Kazmierczak**, F. Boesch, C. Suffel, D. Gross, Forbidden Subgraph Conditions on the Complement of a Graph that Insure a Strong Network Design, *Congressus Numerantium*, vol. 161, (2003) pp. 65-74.

F. T. Boesch, D. Gross, **L. W. Kazmierczak**, J. M. Stiles, C. L. Suffel, On Extensions of

Turán's  
Theorem, *Graph Theory Notes XL of the New York Academy of Sciences* (2001) pp. 42-45.

## GRANTS AND CONTRACTS

Principal Investigator, New Jersey Department of Education, Math and Science Partnership (MSP) competitive grant, 13-MS10-G07, Aug. 2013 – Aug. 2014, total budget \$367,699

Contracted by publishing company Brooks/Cole - Cengage Learning to author and present in text specific DVD's for the following text books:

J. Stewart, L. Redlin, S. Watson, (2012), *Precalculus: Mathematics for Calculus, 6<sup>th</sup> Edition*, Brooks/Cole - Cengage Learning

J. Stewart, L. Redlin, S. Watson, (2012), *Algebra and Trigonometry, 3<sup>rd</sup> Edition*, Brooks/Cole - Cengage Learning

J. Stewart, L. Redlin, S. Watson, (2013), *College Algebra, 6<sup>th</sup> Edition*, Brooks/Cole - Cengage Learning

Reader for Calculus AP Exam, Educational Testing Service, 2006

## PRESENTATIONS Selected conferences:

“A Forbidden Subgraph Condition on the Complement of a Graph that Ensures Minimum Diameter”, *AMS Conference, Special Session on Graph Theory and Combinatorics*, Stevens Institute of Technology (April 2007) (invited).

“Component Order Edge Connectivity - An Introduction”, *37<sup>th</sup> International Conference on Combinatorics, Graph Theory, & Computing*, Florida Atlantic University, Boca Raton, Florida (March 2006).

“On Invulnerable Networks with Respect to Node Failure”, *AMS Conference, Special Session on Design Theory & Graph Theory*, Atlanta Georgia (January 2005) (invited).

“Realizability Results Involving Two Connectivity Parameters”, *35<sup>th</sup> International Conference on Combinatorics, Graph Theory, & Computing*, Florida Atlantic University, Boca Raton, Florida (March 2004).

“Forbidden Subgraph Conditions on the Complement of a Graph that Insure a Strong Network Design”, *34<sup>th</sup> International Conference on Combinatorics, Graph Theory, & Computing*, Florida Atlantic University, Boca Raton, Florida (March 2003).

### Seminars:

“On Vulnerability of Networks Subject to Node Failure”, National Security Agency, Fort Meade Maryland (2005).

“Realizability Results Involving Two Connectivity Parameters”, *Seminar in Nonlinear Systems & Applied Mathematics*, Stevens Institute of Technology (2004).

“Coherent Model for Network Reliability”, *Extremal Graph Theory Seminar*, Seton Hall University (2003) (invited).

“On the Relationship between Connectivity and Component Order Connectivity”, *Mathematical Optimization Symposium*, Stevens Institute of Technology (2002).

“On the Relationship between Connectivity and Component Order Connectivity”, *Graduate Student Conference for the Arthur E. Imperatore School of Sciences and Arts*, Stevens Institute of Technology (2002).

## **PROFESSIONAL SERVICE**

Organized *Graph Theory Day 64* sponsored by the Mathematical Association of America, Stevens Institute of Technology, (2013) Refereed

the following papers:

“You May Rely on the Reliability Polynomial for Much More than You Might Expect” for the *American Mathematical Monthly*

“On A Kind of Restricted Edge Connectivity of Graphs” for *Discrete Applied Mathematics*

“Some New Families of S3-Maximum Graphs” for *International Journal of Computer Mathematics*

**SCHOOL SERVICE** Created the first Graduate Student Instructor Training Program at Binghamton University, 2014-present

Introduced and implemented a new 2-credit curriculum (half semester system) for teaching Calculus I & Calculus II, 2015-present

Developed a new 2-credit Introduction to Calculus course at Binghamton University for students intending to take Calculus I but have weak precalculus Skills, 2015-present

Co-Director, Graduate Academics TA Training Program (instruct all first-year TA’s at the Institute best practices for teaching recitations), 2010 - 2013

Academic advisor for all undergraduate math majors, 2007 - 2013

Faculty advisor, Actuary Club, 2010 - 2013

Faculty advisor, Sigma Nu (fraternity), 2010 - 2013

Prepared complex analysis section for qualifying exam, 2005 - 2013

## **SKILLS**

Camtasia, WebAssign, WileyPlus, Moodle, eLearn (WebCT), Blackboard

**PETER L. K. KNUEPFER**  
**BRIEF VITAE**

Dept. of Geological Sciences and Environmental Studies  
Binghamton University  
Binghamton, NY 13902-6000  
Phone: (607) 777-2389; Fax: (607) 777-2288  
e-mail: Peter.Knuepfer@binghamton.edu

**Education**

Stanford University, B.S. Geology, 1976; M.S. Geology, 1977  
University of Arizona, Ph.D. Geosciences, 1984

**Professional and Educational Work Experience**

Current: State University of New York at Binghamton, Associate Professor of Geology. Faculty member since 1986. Director, Environmental Studies Program, 2002-2013.  
President, State University of New York University Faculty Senate and Member, SUNY Board of Trustees, 2013-2107; Immediate Past President, 2017-present.  
Institute for the Study of the Continents, Cornell University, Postdoctoral Research Associate, Jan 1985-Jan 1986.  
Woodward-Clyde Consultants, 1976-1981

**Research and Scholarly Activities**

11 research grants at Binghamton. 10 research grants during prior employment. Most for studies of paleoseismicity (prehistoric earthquakes) or of responses of rivers to active mountain-building in Idaho, New Zealand, and Taiwan. Recent research: historic river modifications in New York; glacial geology in parts of the state; flood history of the upper Susquehanna River basin; changes that are occurring in flood intensity in the Northeast US.  
Several consulting contracts at Binghamton, including work on probabilistic seismic hazards assessment for Yucca Mountain repository in Nevada and Idaho National Engineering Lab.  
Organized five scholarly conferences or special sessions at major geology meetings; invited participant at an additional five conferences.  
Author or co-author of 49 published papers and over 100 presentations at regional, national, and international professional meetings, plus 3 presentations at conferences on shared governance.  
Principal supervisor of 15 M.A./M.S. students and 5 Ph.D. students who have or soon will complete degrees at Binghamton. Undergraduate advisor to several hundred environmental studies majors and geology majors.

**Professional and Community Service at Binghamton**

Departmental duties: Graduate and Undergraduate Committees; Director of Graduate Studies in Geological Sciences for 4 years; Undergraduate Director in Geological Sciences for 2+ years (current); member of Environmental Studies Committee for 33+ years; Director of Environmental Studies Program for 11 years;; member of search committees, etc.  
Numerous campus-wide service activities, including charring committees, member of senior administration search committees, campus representative to SUNY-wide Faculty Senate

Peter L. K. Knuepfer (continued)

SUNY-wide service includes 9 years on the University Faculty Senate representing Binghamton, 4 on the Executive Committee; President of SUNY UFS for 4 years (and member of the SUNY Board of Trustees). Member of numerous UFS and SUNY discussion groups and ad-hoc committees on assessment, bylaws, transfer articulation, grading, sexual assault prevention, diversity.

Program reviews at SUNY College of Environmental Science and Forestry (undergraduate program in environmental studies), SUNY College at Brockport (department of geology), SUNY College at New Paltz (environmental geochemical science program).

Professional Service includes Associate Editor, *Geological Society of America Bulletin*; board of Quaternary Geology and Geomorphology section of G.S.A.; guest editor of special issues of *Geomorphology* (3) and *American Journal of Science* (1); numerous grant reviews for NSF, U.S. G.S., Petroleum Research Fund, others; manuscript reviews for more than 10 U.S. and international journals; steering committee for Binghamton Geomorphology Symposium (1988-2012); two review panels for NSF on climate-change education.

#### **Select Recent Publications and Presentations (out of 49 publications and more than 100 professional presentations)**

1. Knuepfer, Peter L.K., and Montz, Burrell E., 2008, Flooding and watershed management: *Journal of Contemporary Water Research and Education*, Issue 139, p. 32-38.
2. Knuepfer, P.L.K., 2009, Post-glacial isostatic rebound, Seneca Lake basin, New York: *Geol. Soc. America, Abstracts with Programs*, v. 41, no. 3, p. 25 (GSA Northeastern Meeting).
3. Miller, N.R., and Knuepfer, P.L.K., 2009, Historic channel change on Esopus Creek, upstream of the Ashokan Reservoir, Catskills, New York: *Geol. Soc. America, Abstracts with Programs*, v. 41, no. 3, p. 38 (GSA Northeastern Meeting).
4. Davis, Dan, Knuepfer, Peter L.K., Miller, Nicolas, and Vian, Mark, 2009, Fluvial geomorphology of the Upper Esopus Creek watershed and implications for stream management, *in* Vollmer, Frederick W., ed., *Field Trip Guidebook*, New York State Geological Association, 81<sup>st</sup> Annual Meeting, SUNY New Paltz, p. 8.1-8.20.
5. Rayburn, J.A., Cronin, T.M., Franzi, D.A., Knuepfer, P.L.K., Willard, D.A., 2011, Timing and duration of North American glacial lake discharges and the Younger Dryas climate reversal: *Quaternary Research* v. 75, p. 541-551.
6. Knuepfer, P.L.K., 2013, Record floods, recurrence, and climate change: Irene and Lee: *Geol. Soc. America, Abstracts with Programs*, v. 45, no. 1, p. 83.
7. Hupfer, R.W., and Knuepfer, P.L.K., 2013, Paleoflood assessment of an abandoned meander, Chenango River, New York: *Geol. Soc. America, Abstracts with Programs*, v. 45, no. 1, p. 134.
8. Storch, J., Stagg, A.I., Knuepfer, P.L.K., Asselin, M.J., and Mould, L., 2017, A Governance Challenge Presents a Governance Opportunity: Lessons from the State University of New York Sexual Assault Prevention Working Group, *in* *Shared Governance in Higher Education*, v. 2; *New Paradigms, Evolving Perspectives*; ed. by Sharon F. Cramer: State University of New York Press.
9. Skaggs, Elizabeth R., and Knuepfer, Peter L.K., 2019, Changes in the morphology of Esopus Creek, Catskill Mountains, New York, 2004-2016, due to anthropogenic and natural factors: *Abstracts with Programs, Geological Society of America*, v. 51, no. 1, Abstract no. 25-2.
10. Knuepfer, Peter L.K., 2019, Changing Flood Frequency in the Northeast United States: Non-Stationarity of 1% Exceedence Flood Estimates: American Geophysical Union Fall Meeting abstract.

## CURRICULUM VITAE

**Thomas R. Kulp**

Associate Professor

Binghamton University, SUNY  
Department of Geological Sciences and Environmental Studies  
4400 Vestal Parkway E.  
Binghamton, NY 13902  
*Phone:* (607) 777-2835 *Email:* tkulp@binghamton.edu

### **EDUCATION:**

*Indiana University, Bloomington, IN*

Ph.D. in Geological Sciences (2002), Area of Specialization: Biogeochemistry

*East Carolina University, Greenville, NC*

M.S. in Geology (1995)

*Juniata College, Huntingdon, PA*

B.S. in Geology (1993)

### **PROFESSIONAL/ACADEMIC EXPERIENCE:**

#### **Employment**

- *Associate Professor*, Binghamton University, Department of Geological Sciences and Environmental Studies (2017 – Present)
- *Assistant Professor*, Binghamton University, Department of Geological Sciences and Environmental Studies (2011 – 2017)
- *Research Microbiologist (GS-13)*, U.S. Geological Survey, Menlo Park CA (2010 – 2011)
- *Microbiologist (GS-12)*, U.S. Geological Survey, Menlo Park CA (2006 – 2010)
- *National Research Council Postdoctoral Research Associate*, U.S. Geological Survey, Menlo Park, CA (2002 – 2006)
- *Lecturer*, Department of Geological Sciences, Indiana University, Bloomington, IN (2001 – 2002)
- *Associate Instructor*, Department of Geological Sciences, Indiana University, Bloomington, IN (1997 – 2001)
- *Teaching Assistant*, East Carolina University, Greenville, NC (1993 – 1995)

### **PUBLICATION AND RESEARCH ACTIVITY:**

#### **SELECTED PUBLICATIONS**

**Selected Refereed Journal Articles** (\* indicates graduate student of T. Kulp as first author).

- (1) Dovick\*, M. A., Kulp, T. R., Arkle, R. S., and Pilliod, D. S., 2016, Bioaccumulation trends of arsenic and antimony in a freshwater ecosystem affected by mine drainage. **Environmental Chemistry**, 13:149-159.

Thomas R. Kulp (continued)

- (2) Li, J., Wang, Q., Oremland, R. S., Kulp, T. R., Rensing, C. And Wang, G., 2016, Microbial antimony biogeochemistry: Enzymes, regulation, and related metabolic pathways. **Applied and Environmental Microbiology**, 82:5482-5495.
- (3) Izbicki, J. A., Kulp, T. R., and O'Leary, D. R., 2016, Use of arsenic-73 to evaluate permanence of *in-situ* arsenic removal during groundwater recharge. **Isotopes in Environmental and Health Studies**, In Review.
- (4) Terry\*, L. R., Kulp, T. R., Wiatrowski, H., Miller, L. G., and Oremland, R. S., 2015, Microbiological oxidation of antimony(III) with oxygen or nitrate by bacteria isolated from contaminated mine sediments. **Applied and Environmental Microbiology**, 81:8478-8488.
- (5) Kulp, T. R., 2014, Early earth: Arsenic and primordial life. **Nature Geoscience**, 7:785-786.
- (6) Maity, J. P., Hou, C. P., Majumder, D., Bundschuh, J., Kulp, T. R., Chen, C. Y., Chuang, L.T., Chen, C. N. N., Jean, J. S., Yang, T. C., and Chen, C. C., 2014, The production of biofuel and bioelectricity associated with wastewater treatment by green algae. **Energy**, 78:94-103.
- (7) Kulp, T. R., Miller, L. G., Braiotta, F., Webb, S. M., Kocar, B. D., Blum, J. S., and Oremland, R. S., 2014, Microbiological reduction of Sb(V) in anoxic freshwater sediments. **Environmental Science and Technology**, 48:218-226.
- (8) Al Lawati, W. M., Jean, J. S., Kulp, T. R., Lee, M. K., Polya, D. A., Liu, C. C., and van Dongen, B. E., 2013, Characterisation of organic matter associated with groundwater arsenic in reducing aquifers of southwestern Taiwan. **Journal of Hazardous Materials**. 262:970-979.
- (9) Bundschuh, J., Maity, J. P., Nath, B., Baba, A., Gunduz, O., Kulp, T. R., Jean, J. S., Kar, S., Yang, H. J., Tseng, Y. J., Bhattacharya, P., and Chen, C. Y., 2013, Naturally occurring arsenic in terrestrial geothermal systems of western Anatolia, Turkey: Potential role in contamination of freshwater resources. **Journal of Hazardous Materials**. 262:951-959.
- (10) Blum, J. S., Kulp, T. R., Han, S., Lanoil, B., Saltikov, C. W., Stolz, J. S., Miller, L. G., and Oremland, R. S., 2012, *Desulfohalophilus alkaliarsenatis* gen. nov., sp. nov., an extremely halophilic sulfate- and arsenate-respiring bacterium from Searles Lake, California. **Extremophiles**. 16:727-742.
- (11) Wolfe-Simon, F., Switzer-Blum, J., Kulp, T. R., Gordon, G. W., Hoelt, S. E., Pett-Ridge, J., Stolz, J. F., Webb, S. M., Weber, P. K., Davies, P. C. W., Anbar, A. D., and Oremland, R. S., 2011, A bacterium that can grow by using arsenic instead of phosphorus. **Science**. 332:1163-1166.
- (12) Hoelt, S. E., Kulp, T. R., Han, S., Lanoil, B., and Oremland, R. S., 2010, Coupled arsenotrophy in a hot spring photosynthetic biofilm at Mono Lake, California. **Applied and Environmental Microbiology**. 76:4633-4639.
- (13) Baesman, S. M., Stolz, J. F., Kulp, T. R., and Oremland, R. S., 2009, Enrichment and isolation of *Bacillus beveridgei* sp. nov. a facultative anaerobic haloalkaliphile from Mono Lake, California, that respire oxyanions of tellurium, selenium, and arsenic. **Extremophiles**, 13:695-705.
- (14) Kulp, T. R., Hoelt, S. E., Asao, M., Madigan, M T., Hollibaugh, J. T., Fisher, J. C., Stolz, J. F., Culbertson, C. W., Miller, L. G., and Oremland, R. S., 2008, Arsenic(III) fuels anoxygenic photosynthesis in hot spring biofilms from Mono Lake, California. **Science**. 321:967-970.
- (15) Kulp, T. R., Han, S., Saltikov, C., Lanoil, B., Zargar, K., and Oremland, R. S., 2007, Effects of imposed salinity gradients on dissimilatory arsenate-reduction, sulfate-reduction, and other microbial processes in sediments from two California soda lakes. **Applied and Environmental Microbiology**. 73:5130-5137.
- (16) Kulp, T. R., Hoelt, S. E., Miller, L. G., Saltikov, C., Nilsen, J., Han, S., Lanoil, B., and Oremland, R. S., 2006, Dissimilatory arsenate- and sulfate reduction in sediments of two hypersaline, arsenic-rich soda lakes: Mono and Searles Lakes, California. **Applied and Environmental Microbiology**. 72:6514-6526.
- (17) Oremland, R. S., Kulp, T. R., Switzer-Blum, J., Hoelt, S. E., Baesman, S., Miller, L. G., and Stolz, J., 2005, A microbial arsenic cycle in a salt-saturated, extreme environment. **Science**. 308:1305 - 1308.

- (18) Kulp, T. R., Hoeft, S. E., and Oremland, R. S., 2004, Redox transformations of arsenic oxyanions in periphyton communities. **Applied and Environmental Microbiology**. 70:6428–6434.
- (19) Kulp, T. R., and Pratt, L., 2004, Speciation and weathering of selenium in Upper Cretaceous chalk and shale from South Dakota and Wyoming, USA. **Geochimica et Cosmochimica Acta**. 68:3687-3701.

Thomas R. Kulp (continued)

## FUNDED GRANTS AND AWARDS

*Title:* Antimony stable isotope systematics during bacterial and abiotic redox cycling.

*PI:* Thomas Kulp and co-PI Thomas Johnson

*Sponsor:* National Science Foundation, Geobiology and Low Temperature Geochemistry Program

*Amount:* **\$328,821** *Award Period:* 2017 - 2020

*Title:* NSF Geopaths Extra Grant: Freshman research in biogeochemistry for engagement and retention.

*PI:* Joseph Graney and co-PIs Thomas Kulp, Tim Lowenstein, Nancy Stamp, and Wexing Zhu

*Sponsor:* National Science Foundation, GEOPATHS Extra Program

*Amount:* **\$499,052** *Award Period:* 2015 - 2017

*Title:* Acquisition of a Laser-Ablation-HPLC-ICP-MS system.

*PIs:* Thomas Kulp and co-PIs Joseph Graney, Tim Lowenstein, and Richard Naslund

*Sponsor:* National Science Foundation, Earth Sciences Instrumentation and Facilities Program

*Amount:* **\$249,800** *Award Period:* 2015 - 2016

*Title:* Monitoring stream biota and habitats after Meadow Creek stream restoration in the Stibnite Mine tailings area and effects of prescribed fire in Bald Hill Fuels Treatment project area.

*PIs:* David Pilliod and co-PI Thomas Kulp

*Sponsor:* U.S. Forest Service

*Amount:* **\$35,599** (\$15,000 pass-through to Binghamton University) *Award Period:* 2012 - 2013

*Title:* Porewater and core analysis at the Little Blue Run impoundment.

*PI:* Thomas Kulp

*Sponsor:* Electric Power Research Institute

*Amount:* **\$27,391** *Award Period:* 2012 - 2013



## BIOGRAPHICAL SKETCH OF TIM K. LOWENSTEIN

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### (a) PROFESSIONAL PREPARATION

<i>Undergraduate Institution</i>	<i>Location</i>	<i>Major</i>	<i>Degree &amp; Year</i>
Colgate University	Hamilton, NY	Geology	B.S. 1978
<i>Graduate Institution</i>	<i>Location</i>	<i>Major</i>	<i>Degree &amp; Year</i>
Johns Hopkins University	Baltimore, MD	Geology	Ph.D. 1983

### (b) APPOINTMENTS

2017-2018	Distinguished Professor, Dept. of Geol. Sci. & Envi. Studies, Binghamton University
1997-2017	Professor, Dept. of Geol. Sciences & Environmental Studies, Binghamton University
2003-2006	Chair, Dept. of Geological Sciences & Environmental Studies, Binghamton University
1991-1996	Associate Professor, Dept. of Geol. Sciences & Envi. Studies, Binghamton University
1985-1991	Assistant Professor, Dept. of Geol. Sciences & Envi. Studies, Binghamton University
1983-1985	Research Geologist, Conoco Inc., Ponca City, Oklahoma

### (c) PUBLICATIONS (out of 83 journal articles, 20 book chapters)

#### (c.i) PUBLICATIONS MOST RELATED TO THE PROPOSED PROJECT

1. Lowenstein, T.K., Dolginko, L.A.C., and Garcia-Veigas, J. The influence of magmatic-hydrothermal activity on brine evolution in closed basins: Searles Lake, California. *Geological Society of America Bulletin*, 128:1555-1568 doi:10.1130/B31398.1(2016).
2. Forester, R.M., Lowenstein, T.K., and Spencer, R.J. An ostracode based limnologic history of Death Valley. *Geological Society of America Bulletin*, 117:1379-1386 (2005).
3. Lowenstein, T.K., Li, J., Brown, C.B., Roberts, S.M., Ku, T.-L., Luo, S., and Yang, W. 200 k.y. paleoclimate record from Death Valley salt core: *Geology*, 27: 3-6 (1999).
4. Ku, T.-L., Luo, S., Lowenstein, T.K., Li, J., and Spencer, R.J. U-Series chronology of lacustrine deposits in Death Valley, California: *Quaternary Research*, 50:261-275 (1998).
5. Yang, W., Krouse, H.R., Spencer, R.J., Lowenstein, T.K., Hitcheon, I.E., Ku, T.-L., Li, J., Roberts, S.M., and Brown, C.B. A 200,000-year record of change in oxygen isotope composition of sulfate in a saline sediment core, Death Valley, California: *Quaternary Research*, 51:148-157 (1999).

#### (c.ii) OTHER SIGNIFICANT PUBLICATIONS

1. Lowenstein, T.K., Jagniecki, E. A., Carroll, A. R., Smith, M. E, Renaut, R.W., and Owen, R. B. The Green River salt mystery: What was the source of the hyperalkaline lake waters? *Earth-Science Reviews*, 173: 295-306 (2017).
2. Jagniecki, E.A., Lowenstein, T. K., Jenkins, D. M., and Demicco, R. V. Eocene atmospheric CO<sub>2</sub> from the nahcolite proxy. *Geology*, 43:1075-1078 (2015).
3. Lowenstein, T.K., and Demicco, R.V. Elevated Eocene atmospheric CO<sub>2</sub> and its subsequent decline. *Science*, 313, 1928 (2006).
4. Lowenstein, T.K., Hardie, L.A., Timofeeff, M.N., and Demicco, R.V. Secular variation in seawater chemistry and the origin of calcium chloride basinal brines. *Geology*, 31: 857-860 (2003).
5. Lowenstein, T.K., Timofeeff, M.N., Brennan, S.T., Hardie, L.A., and Demicco, R.V. Oscillations in Phanerozoic seawater chemistry: Evidence from fluid inclusions: *Science*, 294:1086-1088 (2001).

Tim K. Lowenstein (continued)

**(d) SYNERGISTIC ACTIVITIES**

1. **Education.** Principal advisor to 19 M.S. students, 11 Ph.D. students and 6 post-doctoral fellows. Faculty member of the Binghamton University Freshman Research Immersion (FRI) program, Biogeochemistry Research Stream (2016-2018): research experience for first-year students. Working alongside faculty and fellow students on research projects in their early college years, participants in the FRI program [set a course for college and career success](#).
2. **Outreach.** Mineralogical Society of America Distinguished Lecturer for 2006-2007; I gave 17 lectures at 9 universities in the US and Germany.

Mars Science Lab (MSL) Landing Site Workshop, outside expert on evaporites for meeting October, 2007, Pasadena, CA; Member of the NASA/JPL Mars Sample Return Science Steering Group: Meeting at JPL Pasadena, CA, Oct. 2004; Consultant for the Mars Rover Team, April, 2004, including a visit to JPL to teach a short course to Rover scientists on evaporites.

Involved in public outreach through informal and formal science programs for K-12 students and teachers including: Participant in Science Teachers of New York State (STANYS) workshops and meetings; Kopernik Observatory Link Summer Science Explorations for middle school students; Visits to MacArthur Elementary school, Binghamton, Glenwood Elementary school, Vestal.

Organized NSF Sponsored Teachers Workshops (2005, 2006) with full day “hands on” demonstrations of activities in geobiology attended by 15 area high school and middle school teachers. Participants were taught microscopy, crystal growing techniques, methods for the study of DNA, and methods for surface sterilizing crystals and preparation of cell cultures. Presentations emphasized research results from NSF sponsored study of ancient microorganisms trapped in salt crystals.

New York State Master Teacher Program: Lectures on climate change to high school science teachers; field trip (2018) exploring the geology of New York); participation in the selection of master teachers (2016-2018).

Binghamton University Dean’s Distinguished Lecture (2015) to the university and Binghamton community: “Predicting Future Climate Change from the Study of Earth’s Past”.

Climate Change Course (2017, 2018) taught for Lyceum (lifetime-learning association for adult learners over 50 years of age, affiliated with Binghamton University and Road Scholar) general climate change (2017) and climate change: Impacts on New York (2018).

3. **Research Community.** Served as Associate Editor for *Geology* and *Geochimica et Cosmochimica Acta*.

Binghamton University Award for Excellence in Research (2001)  
Mineralogical Society of America Lecturer (2006-2007)  
Geological Society of America: Israel C. Russell Award (Limnogeology Division) (2012)  
Elected Fellow, Society of Economic Geologists (2012)  
Elected Fellow, Mineralogical Society of America (2013)  
Elected Fellow, Geological Society of America (2013)  
Geological Society of America: Laurence L. Sloss Award (Sedimentary Geology Division) (2016)  
Binghamton University Distinguished Professor (2016)

**George A. Meindl**

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4400 Vestal Parkway East, Binghamton, NY 13902

Phone: 607-777-6793  
Email: gmeindl@binghamton.edu

---

**EDUCATION**

- 2014      **PhD**, Ecology and Evolution, University of Pittsburgh, Pittsburgh, PA  
            Advisor: Dr. Tia-Lynn Ashman
- 2009      **M.S.**, Biology, Humboldt State University, Arcata, CA  
            Advisor: Dr. Michael Mesler
- 2007      **B.S.**, *cum laude*, Environmental Biology, Humboldt State University, Arcata, CA

**RECENT PEER-REVIEWED PUBLICATIONS**

- Meindl, G. A.**, N. Schleissmann, B. Sander, M. Lam, W. Parker, C. Fitzgerald, R. Oltmer, and J. Hua. 2020. Exposure to metals (Ca, K, Mn) and road salt (NaCl) differentially affect development and survival in two model amphibians. *Chemistry and Ecology*.
- Robinson, S. A., and **G. A. Meindl**. 2019. Potential for leaching of heavy metals and metalloids from crystalline silicon photovoltaic systems. *Journal of Natural Resources and Development* 9: 19-24.
- Hernández-Gómez, O., S. J. A. Kimble, J. Hua, V. P. Wuerthner, D. K. Jones, B. M. Mattes, R. D. Cothran, R. A. Relyea, **G. A. Meindl**, J. T. Hoverman. 2019. Local adaptation of the MHC class II $\beta$  gene in populations of wood frogs (*Lithobates sylvaticus*) correlates with proximity to agriculture. *Infection, Genetics and Evolution* 73: 197-204.
- Miller, E., and **G. A. Meindl**. 2019. The importance of education and community engagement towards sea turtle conservation. *Alpenglow: Binghamton University Undergraduate Journal of Research and Creative Activity*, 5(1).
- Wersebe, M., P. Blackwood, Y. T. Guo, J. Jaeger, D. May, **G. A. Meindl**, S. N. Ryan, V. Wong., J. Hua. 2019. The effects of different cold-temperature regimes on development, growth, and susceptibility to an abiotic and biotic stressor. *Ecology and Evolution* 9: 3355-3366.
- Wuerthner, V. P., J. Jared, P. S. Garramone, C. O. Loomis, Y. Pecheny, R. Reynolds, L. Deluna, S. Klein, M. Lam, J. Hua, and **G. A. Meindl**. 2019. Inducible pesticide tolerance in *Daphnia pulex* influenced by resource availability. *Ecology and Evolution* 9: 1182-1190.
- Meindl, G. A.**, D. G. DiGiacopo, S. Ryan, J. Jaeger, M. Wersebe, A. Martin, S. A. Robinson, G. Graham, A. R. Palmer, A. Setteducate, I. Murray, K. Prior, and J. Hua. 2018. Interaction between invasive plant leaf litter and NaCl on two model amphibians. *Biological Invasions* 21: 391-403.
- Meindl, G. A.**, and T.-L. Ashman. 2017. Effects of soil metals on pollen germination, fruit production, and seeds per fruit differ between a Ni hyperaccumulator and a congeneric nonaccumulator. *Plant and Soil* 420: 493-503.

**IN REVIEW**

- Seyfried, A. P., E. B. Miller, S. E. Pender, and **G. A. Meindl**. Low income and high minority populations have relatively less access to greenspace in Binghamton, NY. *The Journal of Environmental Planning and Management*.

**RECENT PROFESSIONAL EXPERIENCE**

- 2016-present    **Visiting Assistant Professor**, Binghamton University, Environmental Studies Program
- 2016-present    **Outreach Coordinator**, Binghamton University, Freshman Research Immersion program
- 2015-2016      **Research Associate**, Binghamton University, Dept. of Biological Sciences
- 2015              **Research Associate**, Purdue University

**George A. Meindl - continued**

**RECENT AWARDS / HONORS**

2018 Career Champion, Binghamton University.

**RECENT RESEARCH FUNDING**

2017 Co-PI Robert F. Schumann Foundation. Binghamton University and Roberson Science Center Ecosystems Collaborative Education Program, \$178,530

**RECENT OUTREACH / SERVICE**

2016-present Outreach coordinator for the Freshman Research Immersion Program, Binghamton University.

**RECENT ORAL PRESENTATIONS**

2019 SUNY Oneonta Biology Department seminar series. Title: Reproductive ecology of nickel hyperaccumulation in serpentine *Streptanthus* spp. (Brassicaceae).

Sustainable Communities Transdisciplinary Areas of Excellence Lecture Series, Binghamton University. Title: Course-based undergraduate research experiences in the Environmental Studies Program, Binghamton University.

The Naturalists' Club of Broome County. Title: Pollination biology and pollinator conservation.

The Tioga Gardens Fall Lecture Series. Title: Pollination biology and pollinator conservation.

First Year Experience Lecture Series, Binghamton University. Title: Course-based undergraduate research experiences in the Environmental Studies Program, Binghamton University.

**RECENT POSTER PRESENTATIONS**

2020 9<sup>th</sup> World Congress of Herpetology. Title: A course-based undergraduate research experience (CURE) in amphibian ecology: interaction between invasive plant leaf litter and NaCl on two model amphibians. Dunedin, New Zealand.

2019 Binghamton University Community Engagement Showcase. Title: Mapping and understanding greenspace distribution and socioeconomic inequalities in Binghamton, New York.

Binghamton University Community Engagement Showcase. Title: Addressing the problem of food insecurity in Binghamton through community garden fruit trees.

Binghamton University Community Engagement Showcase. Title: Managing street tree diversity on Binghamton University's campus.

# Steven Murphy

Email: smurphy@binghamton.edu  
1 Ely Park Blvd, Apt C3, Binghamton, NY 13905  
Cell: 845-820-2296

## Education

### University of Connecticut, Ph.D. Chemistry, 2018

Thesis: "Doped Titanium Dioxide Aerogels for Various Catalytic and Photocatalytic Applications." (Advisor: Prof. Steven L. Suib) 3.77 GPA.

### Binghamton University, B.S. in Chemistry, 2012

Thesis: "The Effect of Solvent on Conductive Polyaniline Thin Film Composites." (Advisor: Prof. Wayne E. Jones Jr.)

## Professional Teaching, Research, and Work Experience

- **August 2018 – Present, Lecturer in General Chemistry, Binghamton University, Binghamton, NY.**
  - Responsible for teaching 1000+ students in numerous general chemistry tracks each semester
  - Create and administer quizzes, exams and homework sets
  - Manage course logistics for discussion nights and the course learning management system
  - Supervise 40+ undergraduate teaching assistants, and 20+ graduate teaching assistants
  - Held numerous planned and unplanned meeting with students regarding issues inside and outside of the course, in addition to advising.
- **June 2018 – July 2018, Visiting Professor, University of Connecticut, Waterbury, CT.**
  - Lead lecture with 30 students
  - Write syllabus and course calendar
  - Create and administer quizzes, exams, and homework sets, along with grading for all mentioned
  - Prepare lecture slides
  - Answer course related emails
- **August 2012-May 2018, Teaching Assistant, University of Connecticut, Storrs, CT.**
  - Lead general chemistry discussions.
  - Supervise undergraduate laboratory sections, in both advanced and general chemistry.
  - Grade student assignments, quizzes, lab reports, participation, and exams.
  - Offer student feedback and counsel.
  - Lead supplemental instruction sessions for students.
  - Serve as a liaison between the course instructor and teaching assistants.
  - Administrative tasks in service to the course instructor.
  - Create instructional videos in chemistry.
- **May 2013-May 2018, Research Assistant, University of Connecticut, Storrs, CT.**
  - Develop and characterize novel metal oxide catalysts for various reactions, including degradation of volatile organic compounds, photocatalytic dye degradation reactions and organic oxidations.
  - Deposit boron nitride on silicon carbide substrates via low pressure techniques and determine flexibility and resiliency of the process to common contaminants such as water and oxygen.
  - Maintain laboratory cleanliness and ensure safety procedures are followed diligently.
  - Train both undergraduate and new graduate students in laboratory research.
- **August 2014-December 2015, Quantitative Learning Center Graduate Supervisor, University of Connecticut, Storrs, CT.**
  - Supervised the undergraduate tutoring center for the UCONN Storrs campus (5-10 student tutors and up to 40 students tutored at one time).
  - Designed and conducted review sessions for undergraduate students (50+) in chemistry.

- Designed and conducted learning workshops for undergraduate tutors (10+) working at the center.
- Assisted in the development of innovative ideas for the center regarding student outreach.
- **August 2010-May 2012, Undergraduate Research Assistant, Binghamton University, Vestal, NY.**
  - Created polymer nanocomposite thin films containing polyaniline and different polymer matrices.
  - Conducted literature searches of current research topics relating to conducting polymers in the hopes of improving the mechanical properties of such materials.
  - Conducted UV-Vis spectroscopy and conductivity measurements of thin films created.
  - Improved the thermal stability of different dye materials obtained from private chemical company via binding to Zinc Oxide and incorporating them into polymer matrices.
  - Conducted UV-Vis spectroscopy on films made using these matrices to determine dye quality post-incorporation.

## Publications

4. **Murphy, S.C.**; Khanna, H.; Kerns, P; Mirich, A.; Meguerdichian, A; Suib, S.L. Mesoporous titanium dioxide aerogels for catalytic and photocatalytic applications. *In prep.*
3. Meguerdichian, A.G.; Moharreri, E.; Shirazi-Amin, A.; **Murphy, S.C.**; Macharia, J.; Zhong, W.; Jafari, T.; Suib, S.L. Synthesis of Large Mesoporous and High Pore Volume Mixed Crystallographic Phase Manganese Oxide. *In prep.*
2. Hay, S.O.; Obee, T.; Luo, Z.; Jiang, T.; Meng, Y.; He, J.; **Murphy, S.C.**; Suib, S. The viability of photocatalysis for air purification. *Molecules*. **2015**, *20*, 1319-1356.
1. Mushibe, E.K.; Andala, D.; **Murphy, S.C.**; Raiti-Palazzolo, K.; Duffy-Matzner, J.L.; Jones Jr., W.E.; Electrically conducting polymers as metal binder in electroless deposition of copper in copper nanotubes fabrication. *Langmuir*. **2012**, *28*, 6684-6690.

## Oral Presentations

1. **2017** Chemistry Departmental Seminar Series, University of Connecticut, Storrs, CT. **Murphy, S.C.**; Suib, S.L. "Synthesis and Optimization of Doped Titania Aerogels for Photocatalytic Dye Degradation."

## Poster Presentations

1. **Murphy S.C.**; Hartzell, S.; Mushibe, E.K., Jones Jr., W.E.; Study of electrical conductivity for solvent dependent nanocomposites: polyaniline nanofibers dispersed in polystyrene/polymethylmethacrylate polymer matrix. **March 2012**. 243<sup>rd</sup> National ACS Conference, San Diego, CA.

## Service, Leadership, and Outreach

- **2018 – Present** – Served as faculty advisor for 10+ chemistry majors through Binghamton's Chemistry Department.
- **2018 – Present** – Currently serving on the Undergraduate Programming Committee, which is tasked with constantly improving the undergraduate experience within the chemistry department
- **2018 – Present** – Currently serving the Binghamton Chemistry Outreach Program. This involves coordination of outreach events
- **2018 – Present** – Member and Webmaster for the Binghamton Local Section of the American Chemical Society.
- **2019** – Served as interim administrator and webmaster for the Binghamton Chemistry department.
- **2012, 2013, 2017** – Volunteered for the Connecticut Regional Middle School Science Bowl, an outreach event that bring 100 middle school students to the University of Connecticut for a chance to compete and represent the state at the National Middle School Science Bowl in Washington, D.C. Served as a moderator that would read questions to the students and judge answers, along with other various administrative tasks.
- **2016** – Served as a member of the Graduate Student Advisory Committee (GSAC) for the UCONN Chemistry Department, which spearheaded outreach and volunteer activities along with programming for the chemistry department as a whole.

- **2011-2012** – Served as the Off-Campus College Councils Vice President at Binghamton University, participating in the administration of numerous programs and activities, including providing funding opportunities for student groups seeking aid in putting on programs of their own.
- **2009-2012** – Served as a student government representative for the Student Association at Binghamton University. Represented constituent residential communities on a variety of issues, participating in meetings discussing student group finances, processes and procedures, etc.
- **2009-2010** – Served as a student advocate under the Vice President of Academic Affairs (VPAA) at Binghamton University. Represented and advised students who had committed violations of the student code of conduct.

# JON W. NALE

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## PROFESSIONAL EXPERIENCE

**BINGHAMTON UNIVERSITY- Binghamton, NY**  
*Course Supervisor, Adjunct Lecturer*

May 2009 – Present

- ❖ Design, administer and teach the General Physics curriculum for Physics 121 and 122.
- ❖ Coordinate the instruction of 360 students between 3 professors (including myself), 5 graduate teaching assistants, and the laboratory component of the course.
- ❖ Establish and maintain close collaboration between the other professors in these courses and myself.
- ❖ Provide feedback, structure and guidance for the 5 graduate teaching assistants' duties.
- ❖ Develop assessments and assign final grades for all students.
- ❖ Advise students on prospective pathways within and beyond education.
- ❖ Implement a strong foundation for potential medical students' physics component in the MCAT. Very positive feedback regarding student results.
- ❖ Ignited student interest in a manner such that a number of students have declared physics as their major and a few are currently pursuing their Ph.D. – one originally from my high school classroom.
- ❖ Recognized for outstanding support by Services for Students with Disabilities (Spring 2019) with an award at a reception.

**BINGHAMTON CITY SCHOOL DISTRICT: High School- Binghamton, NY**  
*Physics Teacher, Earth Science Teacher*

Sept. 2004 – Present

- ❖ Instructed Regents, Fast-forward, IB-SL, IB-HL, AP-1 and AP-2 Physics. Many students caught the passion for a second year at a higher level. Inquiry based learning is an instructional foundation.
- ❖ Fostered a respectful rapport amongst students, faculty, staff and administration.
- ❖ Maintained high academic standards and provided pathways to meet them.
- ❖ Built strong STEM skills into students who later remarked on the difference it made in college.
- ❖ Completely redesigned the Physics Laboratory to include leading instructional technology. Students valued the quality of data they were able to collect and learned how to analyze and propagate sources of experimental error in measurement and calculation.
- ❖ IB-SL student success in achieving the world average on their summative IB scores.
- ❖ Participated in the Clinically Rich teacher preparation program founded by SUNY Cortland. Mentored 3 elite future (now current) teachers over the course of a full academic year in 2013/14 and 2015/16. Played an important role in the implementation and success of the program's inauguration at BHS. This program also provided extensive professional development.
- ❖ Pioneered various technological uses for education at BHS including: *Pasco Sensors, Capstone, Data Studio* and *Waveport*, digital projection of lessons (years before Smart Boards), extensive use of physics simulations, student response clicker systems (*Senteo & iClicker*), *Mastering Physics*, student proficiency on MS Excel to spread sheet data, plot data and analyze the impact



of uncertainty with error bars and max / min slope lines.

- ❖ Cornell *CIPT* (CLASSE Institute for Physics Teachers): For 2 years, brainstormed and designed high powered instructional labs for their high school lending library. Co-developed one of their Electricity and Magnetism labs.
- ❖ Data Driven Instruction through the monitoring of test scores, the types of questions missed and the reasons behind it. Corresponding interventions implemented. Discoveries aided in revision of instructional practices for both the current year, and future years as well. Graphical analysis saw a major redesign.
- ❖ Actively recruit future physics students.

**BINGHAMTON UNIVERSITY- Binghamton, NY**  
*Instructional Support Technician / Equipment and Lab Specialist*

Dec. 2000 – Sept.2004

- ❖ Supervised, managed, modified, set up and constructed the General Physics instructional laboratory curriculum and experiments.
- ❖ Instructed Laboratory Teaching Assistants, equipping them with the theoretical and applicable knowledge necessary to teach the introductory labs with confidence & excellence.
- ❖ Developed the Lab TA mentoring program and assessment/feedback format.
- ❖ Revised the laboratory manual and schedule to allow students to have a more concrete understanding of the physical principles being taught.
- ❖ Maintained excellent communication with the lecturing professors to optimize the fluidity between the classroom and laboratory aspects of the introductory courses.
- ❖ Served as a liaison to upper level lab instructors, dealing with equipment, maintenance, special orders and experiment set up.

**MONROE COUNTY BOCES- Spencerport, NY**  
*Special Programs Designer & Instructor*

Winter / Spring 1998, 1999, 2000

- ❖ Designed and implemented a one week long 40-hour program to motivate the interests of elementary and middle school students & teachers in the discipline of Physics.
- ❖ Utilized & pioneered visuals and demonstration apparatus to teach physics via inquiry based learning. (Students desire to learn because they're curiosity motivated)
- ❖ Developed and produced materials to advertise and support this program, in addition to orientation materials to prepare teachers and students for the upcoming program.
- ❖ Innovated and executed full school presentations (200-500 in attendance) as well as equipped students to do the same. Objectively evaluated the efficiency of the program.

## EDUCATION

- ❖ **State University of New York at Binghamton**  
Master of Arts in Teaching (MAT) in Physics, 2000; 3.5 GPA; 24 graduate hours beyond MAT
- ❖ **State University of New York at Brockport**  
Bachelor of Science in Physics, 1997; 3.74 GPA; Sigma Pi Sigma Physics Honor Society

## **SOFTWARE PROFICIENCY**

Windows Environments, UNIX ■ MS: Word, Excel, Power Point, Outlook ■ Web Page Design



## H. Richard Naslund (continued)

- Naslund, H., Mungall, J., Henriquez, F., Nystrom, J., Lledo, H., Lester, G., & Aguirre, R., 2009, Melt inclusions in silicate-lavas and iron-oxide-tephra of the El Laco volcano, Chile, XII Congreso Geológico Chileno, Santiago, Chile, resumen extendido S8-033, 1-4.
- Naslund, H.R., Sparks, J.W., & Fisk, M.R., 1995. Computer modeling of major and trace element variations of Hole 504B diabase and basalt. In Erzinger, J.A., Becker, K., Dick, H.J.B., and Stokking, L.B. (Eds.), Proceedings ODP Science Results, 137/140: College Station, TX (Ocean Drilling Program), p. 53-61.
- Walker, J.R. and Naslund, H.R., 1986. Tectonic significance of mildly alkaline Pliocene lavas in the Klamath River Gorge, Cascade Range, Oregon. Geol. Soc. Amer. Bull. 97, 206-212.

## FIVE OTHER SIGNIFICANT PRODUCTS:

- Latypov, R., Morse, T., Robins, B., Wilson, R., Cawthorn, G., Tegner, C., Holness, M., Leshner, C., Barnes, S., O'Driscoll, B., Veksler, I., Higgins, M., Wilson, A., Namur, O., Chistyakova, R., Naslund, H., & Thy, P., 2015, "A fundamental dispute: A discussion of "On some fundamentals of igneous petrology" by Bruce D. Marsh, Contributions to Mineralogy and Petrology (2013) 166:665-690", Contrib. Mineral. Petrol. 169: 20-30.
- Wotzlaw, J.F., Bindeman, I.N., Schaltegger, U., Brooks, C.K., & Naslund, H.R., 2012, High resolution insights into episodes of crystallization, hydrothermal alteration and remelting in the Skaergaard intrusive complex, Earth and Planetary Science Letters, 355-356: 199-212.
- Bédard, J.H.J., Naslund, H.R., Nabelek, P., Winpenny, Hryciuk, A., M., Macdonald, W. D., Hayes, B., Steigerwaldt, K., Hadlari, T., Rainbird, R., Dewing, K., & Girard, E., 2012, Fault-mediated melt ascent in a Neoproterozoic continental flood basalt province, the Franklin sills, Victoria Island, Canada, GSA Bulletin 124: 723-736.
- Naslund, H.R., Henríquez, F., Nyström, J.O., Vivallo, W., & Dobbs, F.M., 2002. Magmatic iron ores and associated mineralization: Examples from the Chilean high Andes and Coastal Cordillera, in Porter, T.M. (ED.) Hydrothermal iron oxide copper-gold & related deposits: A global perspective, vol. 2, PGC Publishing, Adelaide, 207-226.
- Jang, Y.D., & Naslund, H.R., 2001. Major and trace element composition of Skaergaard plagioclase; geochemical evidence for changes in magma dynamics during the final stage of crystallization of the Skaergaard intrusion. Contributions to Mineralogy and Petrology 140, 441-457.

## SYNERGISTIC ACTIVITIES:

- Developed a program to calculate Niggli and CIPW Norms for igneous petrology courses: NORM-Calc, - An Excel based worksheet, open access at <http://bingweb.binghamton.edu/~naslund/>
- Developed a program to calculate Parent-Daughter Least-Squares-Fit Mixing Models for igneous petrology courses: MINSQFRAC – An Excel based worksheet, open access at <http://bingweb.binghamton.edu/~naslund/>
- Wrote an open access introductory geology textbook: Each of the chapters is designed to fit with one lecture. There are 39 total chapters, each of which is 5 to 8 pages in length. The idea behind the design is to give students a short chapter to provide an alternative look at each topic. The length is kept short, so that students might actually read each chapter assignment. The book is provided on-line free of charge to students.

## Alex Nikulin, Ph.D.

Department of Geological Sciences and Environmental Studies  
Phone: +1 (347) 609 8533 E-mail: anikulin@binghamton.edu

### Education

- Ph.D. Seismology, Rutgers University, The State University of New Jersey 09/2006 - 09/2011  
B.S. Geological Sciences, Binghamton University, The State University of New York 09/2002 - 05/2006

### Professional Experience

#### Binghamton University

**Title: Assistant Professor 09/2015 – Present**

- Pursuing a research project focused on seismic characterization of the Chilean subduction zone inter-plate contact, specifically focused on understanding “flat-slab” subduction mechanisms.
- Pursuing a research project in induced seismicity, focused on understanding the relationship between high-volume injection of wastewater and seismic rupture
- Pursuing a research project on remote identification of unexploded ordnance and landmine detection in postconflict regions using autonomous aerial vehicles.

#### Rutgers University

**Title: Visiting Research Professor 09/2011 – 9/2015**

- Researching mechanisms driving the seismic and volcanic activity of the Kamchatka subduction zone.
- Developed a break-through receiver function depth migration algorithm, allowing illumination of the upper mantle structure beneath the active volcanic front of the Central Kamchatka Depression.
- Published results of this effort may explain unusually active volcanism within the Central Kamchatka Depression and the unique position of the arc relative to the subducting plate.

#### Noble Energy

**Title: Geophysicist, Geoscience Technology Group 01/2014 – 9/2015**

- Worked to integrate multiple geological and geophysical datasets within a common risk analysis algorithm to provide consistently calibrated risk evaluation to exploration prospects.
- Developed and implemented a geometric velocity correction algorithm for seismic reprocessing feasibility analysis, resulting in numerous prospect upgrades across the company.
- Integrated geochemical, geological and geophysical data to categorize and rank prospective basins.

#### Honors College - City University of New York

**Title: Visiting Assistant Professor 09/2011 - 09/2012**

- Developed and implemented new teaching methodologies specifically designed to impact inner-city college students with limited past exposure to geosciences.
- Instructed undergraduate and graduate courses in different class settings, ranging from large introductory courses to small graduate sections.
- Developed undergraduate field trip curriculum and coordinated graduate fieldwork efforts.

### Scientific Publications

- Nikulin A., J.R. Bourke, J.R. Domino, J. Park., 2019, Tracing Geophysical Indicators of Fluid-Induced Serpentinization in the Pampean Flat Slab of Central Chile, *Geochemistry, Geophysics, Geosystems*, in press, accepted August 27, 2019, <https://doi.org/10.1029/2019GC008491>
- Nikulin A., T. S. De Smet., 2019, A UAV-based magnetic survey method to detect and identify orphaned oil and gas wells. *The Leading Edge*, 38 (6), 447-452, <https://doi.org/10.1190/tle38060447.1>
- Nikulin A., T.S De Smet, J Baur, W Frazer, J Abramowitz., 2018, Detection and Identification of Remnant PFM-1 ‘Butterfly Mines’ with a UAV-Based Thermal-Imaging Protocol, *Remote Sensing*, 10 (11), 1672, <https://doi.org/10.3390/rs10111672>
- De Smet, A. Nikulin, W. Frazer, J. Baur, J. Abramowitz, D. Finan, S Denara, N. Aglietti, G. Campos., 2018, Drones and "Butterflies": A Low-Cost UAV System for Rapid Detection and Identification of Unconventional Minefields, *The Journal of Conventional Weapons Destruction*, 22 (3), 10.

## Alex Nikulin (continued)

- De Smet, A. Nikulin, 2017, Catching “butterflies” in the morning: A new methodology for rapid detection of aerially deployed plastic land mines from UAVs, *The Leading Edge*, 37 (5), 367-371, <https://doi.org/10.1190/tle37050367.1>
- Gavrilenko M, A Ozerov, P. Kyle, C. Herzberg, M. Carr and Nikulin A., 2014, Constraints on magma evolution at Gorely volcano: mantle lithology, fractional crystallization and mixing, *Bulletin of Volcanology*, 78 (7), 47, <https://doi.org/10.1007/s00445-016-1038-z>
- Iwasaki, T., V. Levin, A. Nikulin and Iidaka T., 2013, Constraints on the Moho in Japan and Kamchatka. *Tectonophysics*, 609. 184-201, <https://doi.org/10.1016/j.tecto.2012.11.023>
- Nikulin, A., V. Levin, M. Carr, C. Herzberg and West M., 2012, Evidence for two upper mantle sources driving volcanism in Central Kamchatka. *Earth and Planetary Sci. Lett.* 321–322, 14–19, doi:10.1016/j.epsl.2011.12.039
- Nikulin, A., V. Levin, A. Shuler, and West M., 2010, Anomalous seismic structure beneath the Klyuchevskoy Group, Kamchatka. *Geophys. Res. Lett.*, 37, L14311, doi:10.1029/2010GL043904
- Nikulin, A., V. Levin, and Park J., 2009, Receiver function study of the Cascadia megathrust: Evidence for localized serpentinization. *Geochemistry, Geophysics, Geosystems.*, 10, Q07004, doi:10.1029/2009GC002376

### Research Grants:

- 2019:** NSF I-Corps – Developing a Remote Sensing Technology for Landmine Detection, \$3,000
- 2019:** Institute for Genocide and Mass Atrocity Prevention Curriculum Development Grant, \$5,000
- 2018:** ACS-PRF, Unconventional Seismic Imaging of Unconventional Reservoirs, \$120,000
- 2018:** Binghamton University Faculty Research Grant, Remote Sensing, \$5,000
- 2017:** Incorporated Institute for Seismology Research Travel Grant, \$5000

### Teaching Experience - Undergraduate Courses

#### Geology 302 Introductory Geophysics, Binghamton University

This is a core course for Binghamton University geology majors and introduces geophysics as a lens to study and understand the Earth. The course consists of a series of lectures and hands-on laboratory exercises. Lectures are focused on introducing the fundamental physical and mathematical concepts of geophysical inquiries and their application to the study of the Earth’s interior. Students engage in a set of laboratory exercises that help them understand the fundamental disciplines of geophysics, their strengths and limitations. Topics include seismology, gravity and magnetometry.

#### Geology 101: Physical Geology, CUNY Honors College

#### Geology 16: Earthquakes, Volcanoes and Moving Continents. CUNY Honors College

#### Geology 383: Special Topics in Geology, Field Methods. CUNY Honors College

#### Geology 12: Natural Disasters. Fall 2011. CUNY Honors College

#### Science 103B: Integrated Science, Fall 2010, The College of New Jersey

#### Geology 456: Introduction to Geophysics Laboratory, Fall 2009, Rutgers University

#### Geology 201: Earthquakes and Volcanoes, Rutgers University

### Teaching Experience - Graduate Courses

#### Geology 450/550: Advanced Geophysics. Binghamton University

This course presents an overview of the fundamentals of seismic methods, including, but not limited to active and passive source seismic techniques, gravity and magnetics. The course involves lecture and discussion sessions of multiple case studies. The course aims to provide students with a broad understanding of the current applications and future direction of applied geophysical methods.

#### Geology 453/553: Applied Geophysics. Binghamton University

The course aims to provide students with a broad understanding of the current applications and future direction of applied geophysical methods, especially as applied in exploration and environmental geophysical realms. The course aims to develop basic field geophysical skills with an emphasis on the acquisition and interpretation of data from practical field studies. Course includes lectures on foundational theories to establish understanding of techniques used in the field (e.g., seismic refraction, seismic reflection, ground penetrating radar, electrical resistivity, gravity,

magnetics).

## **Alex Nikulin (continued)**

### **Geology 501a,b: Earth Composition and Processes, CUNY Honors College**

This course is intended for graduate student pursuing a New York City teaching degree and certification. It focused on advanced topics in the geosciences, as well as topics in environmental studies and geological hazards. The course included an intensive schedule of lectures, lab exercises, field trips and a writing skills development workshop.

### **Geology 763: Geographical Information Systems, CUNY Honors College**

This course was intended to advance student understanding of Geographical Information Systems (GIS) and their use in the geosciences profession. Topics included geographical coordinate systems, use of GPS data systems, integration of data within various GIS platforms and a project dedicated to applying GIS advances in student's thesis projects. Most students that take Geology 763 incorporate their class projects as part of their final thesis research projects.

### **Awards**

**2018:** Tech Briefs Technology Design Contest – First Place, Aerospace and Defense.

**2017:** National Geographic Chasing Genius – Finalist.

**2015:** Incorporated Institutions for Seismology Instructional Award – IRIS Internship Instructor

**2011:** Rutgers University Department of Earth and Planetary Sciences Excellence in Research Award: "Sustaining Volcanism in Central Kamchatka."

**2009:** Rutgers Graduate School Pre-Dissertation Award: "Upper mantle anomaly beneath the Klyuchevskoy Group, origins and implications."

**2008-2008:** NSF Partnership in Research and Education Award

### **Honors**

**2017:** Teaching Award – Best Teaching Department, Binghamton University

**2016:** Teaching Award – Best Teaching Department, Binghamton University

**2010:** Fellowship of Excellence, Rutgers University

**2009:** EarthScope Award

**2008:** IRIS Award

**2007:** Rutgers Graduate School Pre-Dissertation Award

**2007:** Presidential Fellowship, Rutgers University

**2006:** Glen G. Bartle Top of Graduating Class Award, Binghamton University

### **Professional Training**

**GeoTech:** Gravity and Magnetism Exploration Methods

**Nautilus:** Seismic Attributes for Reservoir Characterization

**Nautilus:** A Practical Introduction to Seismic Inversion

**Nautilus:** Using Seismic Data from Acreage Capture to Early Field Development

**Nautilus:** Essentials of Rock Physics for Seismic Attribute Interpretation

**Nautilus:** Logging Instrumentation and Applications

**SCA:** Applied Subsurface Mapping Analysis

**SCA:** Depositional Fairway Identification and Analysis

### **Technical Qualifications**

**Operating systems:** Ubuntu Linux, Red Hat Linux, Mac OS Unix

**Seismic Acquisition Systems:** Quanterra, Guralp, Trillium.

**Programming languages:** Python, MatLab, FORTRAN

**Academic Research Software:** Passcal Software package, IRIS software package, Seismic Analysis Code

# Molly O. Patterson, Ph.D.

# Curriculum Vitae

SEDIMENTOLOGY, STRATIGRAPHY, CYCLOSTRATIGRAPHY, PALEOCLIMATOLOGY, PALEOCEANOGRAPHY

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Phone: 607 777 2831

Twitter: @mopatt5

Website: <https://patterso.wixsite.com/website>

## Education

2015	Ph.D. Geology, Antarctic Research Centre, Victoria University of Wellington, Wellington (New Zealand)
2010	M.S. Geology, Southern Illinois University of Carbondale, Illinois (USA)
2008	B.A. Geology, Colgate University, Hamilton, New York (USA)

## Employment

2016-Present	Assistant Professor, Binghamton University, Binghamton, NY
2015	Postdoctoral Research Associate, University of Massachusetts Amherst, Amherst, MA
2014	Research Assistant, Antarctic Research Centre, Victoria University of Wellington, Wellington, New Zealand
2012	Adjunct Faculty, Open Polytechnic – Natural Resource Centre, Lower Hutt, New Zealand
2010	Research Assistant, Southern Illinois University, Carbondale, IL
2007	Research Assistant, Colgate University/Virginia Institute of Marine Science (VIMS) Hamilton, NY/ Gloucester Point, VA
2005-2006	Research Assistant, Colgate University, Hamilton, NY

## Courses Taught as Instructor/Co-Instructor

- Oceanography (Geol. 112 Binghamton University)
- Climate/Paleoclimatology (Geol. 414/514 Binghamton University)
- Global Change – Geological Perspective (Geol. 115 Binghamton University)
- Introductory Oceanography (Geo-Sci 103 UMass Amherst)
- Introductory Oceanography Honors (Geo-Sci 103H UMass Amherst)
- Sustainable Development and New Zealand (72194 Open Polytechnic, New Zealand – Natural Resource Centre)
- Environmental Impact Assessment (72296 Open Polytechnic, New Zealand – Natural Resource Centre)

## Publications

### Peer-Reviewed Journal Publications

10. McClymont, E. L., Ford, H. L., Ho, S. L., Tindall, J. C., Haywood, A. M., Bailey, I., Garcia, M. A., Littler, K., **Patterson, M.**, Petrick, B., Ravelo, C., Risebrobakken, B., de Schepper, S., Swann, G., Thirumalai, K., 2019, Lessons for a high CO<sub>2</sub> world: an ocean view from ~3 million years ago, in review with *Climate of the Past*.
9. Grant, G. R., Naish, T. R., Dunbar, G. B., Stocchi, P., Kominz, M. A., Kamp, P. J. J., Tapia, C. A., McKay, R., Levy, R. H., and **Patterson, M. O.** 2019, The amplitude and origin of sea-level variability during the Pliocene epoch, *Nature*, v. 574, p. 237-241. <https://www.nature.com/articles/s41586-019-1619-z>
8. **Patterson, M.**, Rhodes, R., & Allen, C., 2019, Understanding Past Changes in Southern Ocean Sea Ice, *EOS*, 100, <https://doi.org/10.1029/2019EO119803>.
7. Grant, G.R., Sefton, J.P., **Patterson, M.O.**, Naish, T.R., Dunbar, G.B., Hayward, B.W., Morgans, H.E.G., Alloway, B.V., Seward, D., Tapia, C.A., Prebble, J.G., Kamp, P.J.J., McKay, R., Ohneser, C., Turner, G. 2018, Mid- to late Pliocene (3.3-2.6 Ma) global sea-level fluctuations recorded on a continental shelf transect, Whanganui Basin, New Zealand, *Quaternary Science Reviews*, v. 201, p. 241-260, <https://doi.org/10.1016/j.quascirev.2018.09.044>.
6. Bertman, R., Wilson, D. J., van de Flierdt, T., McKay, R., **Patterson, M. O.**, Jimmene-Espejo, F. J., Escutia, C., Duke, G., Taylor-Silva, B., Riesselman, C. 2018, Pliocene deglacial event timelines and the biogeochemical response offshore Wilkes Subglacial Basin, East Antarctica, *Earth and Planetary Science Letters*, v. 494, p. 109-116, <https://www.sciencedirect.com/science/article/pii/S0012821X18302632>.
5. **Patterson, M.**, McKay, R., Naish, T., Wilson, G., Ohneser, C., Woodard, S., Bostock, H., and Caballero-Gill, R. 2018, A southwest Pacific perspective on long-term global trends in Pliocene-Pleistocene stable isotope records, *Paleoceanography and Paleoclimatology*, v. 33, p. 825-839, <https://doi.org/10.1029/2017PA003269>.
4. Levy, R., Harwood, D., Florindo, F., Sangiorgi, F., Tripathi, R., von Eynatten, H., Gasson, E., Kuhn, G., Tripathi, A., DeConto, R., Fielding, C., Field, B., Golledge, N., McKay, R., Naish, T., Olney, M., Pollard, D., Schouten, S., Talarico, F., Warny, S., Willmott, V., Acton, G., Panter, K., Paulsen, T., Taviani, M., & **SMS Science Team**, 2016, Antarctic ice sheet sensitivity to



atmospheric CO<sub>2</sub> variations in the early to mid-Miocene: *Proceedings of the National Academy of Sciences of the United States of America*, doi: 10.1073/pnas.1516030113, <http://www.pnas.org/content/early/2016/02/17/1516030113.full?dom=icopyright&src=syn>.

Molly O. Patterson (continued)

3. **Patterson, M.**, McKay, R., Naish, T., Escutia, C., Jimenez-Espejo, F. J., Raymo, M., Meyers, S., Tauxe, L., Benkhuis, H. and IODP Exp. 318 Scientist, 2014, Orbital forcing of the East Antarctic ice sheet during the Pliocene and Early Pleistocene: *Nature Geoscience*, v. 7., p. 841-847, doi:10.1038/ngeo2273, <https://www.nature.com/articles/ngeo2273>.
2. Cook, C. P., van de Flierdt, T., Williams, T. J., Hemmings, S. R., Iwai, M., Kobayashi, M., Jimenez-Espejo, F. J., Escutia, C., Gonzalez, J. J., Khim, B-K., McKay, R., Passhler, S., Bohaty, S. M., Riesselman, C., Tauxe, L., Sugisaki, S., Galindo, A L., **Patterson, M. O.**, Sangiorgi, F., Pierce, E. L., Brinkhui, H. F., Klaus, A., Fehr, A., Bendle, J. A. P., Bijl, P., and IODP Exp. 318 Scientist, 2013, Dynamic Behaviour of the East Antarctic Ice Sheet during Pliocene Warmth: *Nature Geoscience*, v. 6, p. 765-769, doi:10.1038/ngeo1889, <https://www.nature.com/articles/ngeo1889>.
1. **Patterson, M. O** and Ishman, S. E., 2012, Neogene benthic foraminiferal assemblages and paleoenvironmental record for McMurdo Sound, Antarctica: *Geosphere*, v. 8, no. 6, p.1331-1341, <https://pubs.geoscienceworld.org/gsa/geosphere/article/8/6/1331/132605/neogene-benthic-foraminiferal-assemblages-and>.

## Awards and Grants

### Since appointment at Binghamton University Fall 2016

- *International Continental Drilling Program (ICDP)*, full proposal, Co-PI on project titled: Sensitivity of the West Antarctic Ice Sheet to 2 Degrees Celsius (funds requested \$1,200,000 of total project budget \$4,600,000) **pending**
- *National Science Foundation (NSF)*, Office of Polar Programs, Co-PI on project titled: Collaborative Research: Orbital- to millennial-scale variability of the West Antarctic Ice Sheet and the formation of bottom water in the Ross Sea during the Pliocene-Pleistocene, proposal ID 2000992 (BU \$107,487; total \$445,389) **pending**
- *National Science Foundation*, Paleo Perspective on Climate Change (P2C2), PI on project titled: Collaborative Research: The role of the Northwest Pacific Ocean in regional and interhemispheric Plio-Pleistocene climate teleconnections, proposal ID 2002381 (BU \$169,199; total \$674,540) **pending**
- *Binghamton University Data Science Course/Module Development Grant Program*, Co-PI (PI Dr. Jeff Pietras, Co-PI Dr. Tim DeSmet) on proposal "Data Science Course Modules for Geosystems" (\$2,500)
- *Travel grant* (National Science Foundation subaward for U.S. participants), XIII SCAR International Symposium of Antarctic Earth Sciences (ISEAS 2019), Incheon, Republic of Korea (\$1,000)
- *Travel grant* (SCAR - PRAMSO), XIII SCAR International Symposium of Antarctic Earth Sciences (ISEAS 2019), Incheon, Republic of Korea (\$1,000)
- *Travel award*, PAGES Cycles of Sea Ice Dynamics in the Earth System (C-SIDE) Working Group, 24-26 October 2018 Vancouver, Canada (\$500)
- *Analytical and Diagnostics Laboratory (ADL) Small Grant*, Project title: Grain size analysis on Continental Rise Site U1524 (\$2,500)
- *National Science Foundation subaward*, United States Science Support Program Office associated with the International Ocean Discovery Program (USSSP-IODP) (\$34,714)
- *National Science Foundation subaward*, Post Expedition Award - PI on proposal titled: Assessing the role of periodic and non-periodic processes on West Antarctic Ice Sheet stability/instability and deep water formation (\$18,000)
- *Colgate University Department of Geology Faculty Research Grant to the Boyce Fund*, Co-PI (PI - Dr. Amy Leventer) on the project titled: Towards reconstructing Southeast Indian Ocean Circulation and Sediment Drift History (\$6,665)
- *United States Science Support Program*, Australasian IODP Regional Planning Workshop, Travel award July 2017 (\$2,750)
- *Travel award* (National Science Foundation subaward for U.S. participants), Past Antarctic Ice Sheet Dynamics (PAIS) Conference, September 2017 (\$1,766)
- *Individual Development Award*, Binghamton University – awarded funds in support of travel the American Geophysical Union Fall Meeting in San Francisco (\$800.00)

## Invited Talks

- |      |   |
|------|---|
| 2020 | Nelson Lecture Series, Department of Earth Sciences Syracuse University (Dr. Linda Ivany; Dr. Tripti Bhattacharya)  |
| 2019 | Scientific Committee on Antarctic Research (SCAR) PAIS-PRAMSO-AISSL meeting, Incheon, South Korea (Dr. Richard Levy; Dr. Tim Naish)                                 |
| 2018 | Department of Geology Pegrum Seminar University of Buffalo, SUNY (Dr. Elizabeth Thomas; Dr. Kristin Poinar)   |
| 2017 | Department of Geology Stout Lecture at the University of Nebraska (Dr. David Harwood)   |
| 2016 | PAGES: PlioVAR Workshop, Durham University, UK – Towards a synthesis of late Pliocene climate variability recorded in marine sediment archives (Dr. Erin McClymont) |
| 2016 | Department of Geology seminar speaker at Stony Brook University, SUNY (Dr. Greg Henkes)   |
| 2016 | International Ocean Discovery Workshop: Antarctica's Cenozoic ice and climate history: New science and new challenges of  |

- drilling in Antarctic waters, College Station, Texas, May (Dr. Trevor Williams)  
 2016 Binghamton University Department of Geological Sciences and Envi. Studies (Dr. Tim Lowenstein)  
 2016 Earth, Environmental and Planetary Sciences Brown University (Dr. Tim Herbert)  
 2015 Lamont-Doherty Earth Observatory: Plio-Pleistocene geological records workshop (Dr. Heather Ford; Dr. Maureen Raymo)

Molly O. Patterson (continued)

## Synergistic Activities

### Journal Reviewer

- *Paleoceanography and Paleoclimatology* (2017, 2018)
- *Earth and Planetary Science Letters* (2017, 2019)
- Geochemical Society journal of *Geochemistry, Geophysics, Geosystems* (2018)
- *Quaternary Science Reviews* (2019)
- *Global Planetary Change* (2019)

### Proposal Grant Reviewer

- National Science Foundation, Antarctic Integrated System Science (AISS) program (2017)
- Scientific Committee of Antarctic Research (SCAR) Fellowships (2017)

### U.S. Ice Drilling Program Subglacial Access Working Group (SWAG)

- Trista J Vick-Majors, **Molly Patterson**, Britney Schmidt, Keith Makinson, Tilak Hewagama, Jill Mikucki, David Harwood, Dale Winebrenner, Matthew R Siegfried, Alexander B Michaud, Slawek Tulaczyk (2019) [White Paper: Subglacial Access Working Group: Access Drilling Priorities in the Ross Ice Shelf Region](#). *Ice Drilling Program Subglacial Access Working Group Science Planning Workshop, March 29-30, 2019, Herndon, Virginia, USA*, 1-8.

Sridhar Anandakrishnan, Knut Christianson, Meg Daly, Mike Dinniman, Patrik R Kaufmann, John Klink, Alison Murray, **Molly Patterson**, Ross D Powell, Frank R Rack, Britney Schmidt, Jenny Suckale, Slawek Tulaczyk, Jake Walter, Julia Wellner (2016) [White paper: Subglacial Access Working Group - Access Drilling Priorities in the Ross Sea Sector of the Antarctic Ice Sheet](#). *Subglacial Access Working Group Science Planning Workshop, May 22-23, 2016, Herndon, Virginia, USA*, 1-6.

## **DR. JEFFREY T. PIETRAS**

**ADDRESS:** Department of Geological Sciences  
Binghamton University  
4400 Vestal Parkway East  
Binghamton, NY 13902-6000

**OFFICE PHONE:** 607-777-334  
**CELL PHONE:** 315-842-8158  
**EMAIL ADDRESS:** jpietras@binghamton.edu

### **EDUCATION**

Ph.D. in Geology, University of Wisconsin-Madison, December 2003, Advisor: Dr. Alan Carroll Dissertation: High-resolution Sequence Stratigraphy and Strontium Geochemistry of the Lacustrine Wilkins Peak Member, Eocene Green River Formation, Wyoming, U.S.A.

MS in Geology, University of Wisconsin-Madison, December 1998, Advisor: Dr. Toni Simo  
Thesis: Sequence Stratigraphy and Facies Analysis of the Eocene to Oligocene in the Santa Ynez Mountains, California

BS in Geology, Binghamton University, May 1996

### **AREAS OF INTEREST**

Sedimentology and Stratigraphy of Lacustrine/Terrestrial Basins and Marine Mudstones  
Basin Analysis and Tectonics  
Inorganic and Radiogenic Isotope Geochemistry  
Petroleum Geology  
Geospatial/Remote Sensing Data Acquisition, Integration, and Interpretation

### **ACADEMIC EXPERIENCE**

Associate Professor, Geological Sciences, Binghamton University, 2013-present

Research Assistant, Department of Geology, University of Wisconsin-Madison, 1998, 1999-2003

Teaching Assistant, Department of Geology, University of Wisconsin-Madison, 1996-98, 1999

### **PETROLEUM INDUSTRY EXPERIENCE**

Exploration Geologist, BP Brazil, Houston, TX, 2012-213

Exploration Geologist, BP America, Inc., Calgary, AB and Houston, TX, 2008- 2012

Exploration Geologist, BP Sakhalin, Inc., Houston, TX, 2005- 2008

Production and Appraisal Geologist, BP Exploration Alaska, Inc., Anchorage, AK, 2003- 2005

Intern, BP America Inc., Houston TX, 2001

Intern, Mobil Technology Company, Dallas, TX, 1998

Intern, Exxon Company USA, Thousand Oaks, CA, 1997

### **Funded Grants**

Petroleum Research Foundation, PI, 2015, Rhenium-Osmium Isotope Systematics: Application of Osmium Isotope Stratigraphy and Geochronology in Lacustrine Organic-rich Mudstones, \$110,000

S<sup>3</sup>IP Small Grant Award, Binghamton University, PI, Chemical Analysis of Shale Gas Reservoirs, \$2,500

BP, 2013, Computer Workstation Donation, *estimated* \$74,124

### **SERVICE**

#### *Professional*

Student Chapter Liaison, 2018-present, Eastern Section of the AAPG

Peer Reviewer, 2014-present, 15 manuscripts, 1 NSF grant proposal, 1 PRF grant proposal

Topical session co-chair, 2018, Green River Formation and Other Ancient Lacustrine Analogues, AAPG Convention & Exhibition

Topical session co-chair, 2018, Evolution of the Taconic Foreland: Insights into Active Margins and Global Climate Change, NE GSA Annual Meeting

Topical session co-chair, 2014, Modern and Ancient Continental Depositional Environments: Linking Landscape

Evolution with Fluvial Systems and Lacustrine Basins through the Cenozoic, GSA Annual Meeting  
JEFFREY T. PIETRAS (CONTINUED)

Topical session co-chair, 2004, Lacustrine Records of Landscape Evolution, GSA Annual Meeting  
Field trip co-leader, 2002, Stratigraphy of the Green River Formation, GSA Annual Meeting

#### *Professional Development*

Geological Society of America Member, 1996-present  
American Association of Petroleum Geologists Member, 1998-present  
Faculty Advisor AAPG Student Chapter and Imperial Barrel Award Team, 2017-present  
Invited Speaker, Spring 2018, Binghamton University Art Museum, XRF demonstration of pigments  
Invited Speaker, Fall 2017, Department of Earth Sciences at Syracuse University  
Invited Speaker, Fall 2016, Center for Integrative Geosciences at the University of Connecticut  
Workshop Participant, Fall 2016, Continental Scientific Drilling Coordination Office Science Planning, Scientific Drilling/Coring and Earth-Life System Evolution  
Presenter and participant, Summer 2014, SUNY Water Resources and Natural Gas Workshop

#### **AWARDS AND HONORS**

Career Champion, Binghamton University 2017  
Distinguished Graduate Student Award- Dept. of Geology and Geophysics, UW-Madison 2003  
Glenn G. Bartle Award in Geology-Department of Geology, Binghamton University 1996

#### **Manuscripts (past 5 years)**

**Pietras, J.T.**, Selby, D., Brems, R., and Dennett, A., *in review*, Tracking drainage basin evolution, continental tectonics, and climate change: Implications from osmium isotopes of lacustrine systems: *Palaeogeography, Palaeoclimatology, Palaeoecology*..

**Pietras, J.T.**, and Spiegel, E., 2018, XRF-based chemostratigraphy between and across two disconformities in the Ordovician Trenton Group and Utica Shale of central New York, USA: *Journal of Sedimentary Research*, v. 88, p. 365-384.

Tufano, B.C., and **Pietras, J.T.**, 2017, Coupled flexural-dynamic subsidence modeling approach for retro-foreland basins: Example from the Western Canada Sedimentary Basin: *GSA Bulletin*, v. 129, p. 1622-1635.

Murphy, J.T., Lowenstein, T.K., and **Pietras, J.T.**, 2014, Preservation of primary lake signatures in alkaline earth carbonates of the Eocene Green River Wilkins Peak-Laney Member transition zone: *Sedimentary Geology*, v. 314, p. 75-91.

Batchelor, C.L., Dowdeswell, J.A., and **Pietras, J.T.**, 2014, Evidence for multiple Quaternary ice advances and fan development from the Amundsen Gulf cross-shelf trough and slope, Canadian Beaufort Sea margin: *Marine and Petroleum Geology* v. 52, p. 125-143.

Doebbert, A.C., Johnson, C., Carroll, A.R., Beard, B. **Pietras, J.T.**, Rhodes Carson, M., Norsted, B., and Throckmorton, A., 2014, Controls on Sr isotopic evolution in lacustrine systems: Eocene Green River Formation, Wyoming: *Chemical Geology*, v. 380, p. 172-189.

Tozer, R.S.J., Choi, A.P., **Pietras, J.T.**, and Tanasichuk, D.J., 2014, Athabasca Oil Sands: Megatrap restoration and charge timing: *AAPG Bulletin* v. 98, p. 429-447.

#### **ABSTRACTS (PAST 5 YEARS)**

Rust, T.J., and **Pietras, J.T.**, 2019, Characterization of marine mudstones: towards a statistical approach to interpret XRF data: GSA Annual Meeting.

Amoriello, D., **Pietras, J.T.**, and Rust, T., 2018, High resolution XRF stratigraphy of the Ordovician Utica Shale, central New York State, AAPG Eastern Section and SPE Eastern Regional Meeting.

**Pietras, J.T.**, Selby, D., and Dennett, A., 2018, Osmium isotope stratigraphy and radiogenic age determinations of the Green River Formation in Utah, USA: AAPG Annual Convention 2018.

**Pietras, J.T.**, Spiegel, E.B., and Miserendino, D.R., 2018, Depositional processes and XRF geochemistry of the Utica Shale within the Ordovician outcrop belt in central New York State: GSA Northeastern Section Annual Meeting.

Rust, T.J., **Pietras, J.T.**, and Graney, J.R., 2018, Characterizing Utica Shale depositional processes using portable XRF

analysis and positive matrix factorization: GSA Northeastern Section Annual Meeting.

JEFFREY T. PIETRAS (CONTINUED)

- Martone, P., Nikulin, A., and **Pietras, J.**, 2017, Recent earthquakes mark the onset of induced seismicity in northeastern Pennsylvania: AGU Fall Meeting 2017.
- Rust, T.J., Miserendino, D.R., **Pietras, J.T.**, and Graney, J.R., 2017, Characterizing Utica Shale depositional processes using portable XRF analysis and positive matrix factorization: GSA Annual Meeting 2017.
- Royce, B., Patterson, M., and **Pietras, J.**, 2017, Late Pliocene depositional history and paleoclimate reconstructions of the southwest Pacific: Past Antarctic Ice Sheet Dynamics Conference 2017, Triste Italy.
- Martone, P., Nikulin, A., and **Pietras, J.**, 2017, Tracking the onset of induced seismicity in northeastern Pennsylvania: 2017 EarthScope National Meeting, Anchorage, AK.
- Pietras, J.T.**, Miserendino, D.R., and Spiegel, E., 2017, Sedimentology and XRF-based elemental geochemistry of cores from the Trenton Group and Utica Shale along the Ordovician outcrop belt in central New York: AAPG Annual Convention 2017.
- Domino, J., Bourke, J.R., **Pietras, J.T.**, and Nikulin, A., 2016, Constraining subduction zone dynamics of the Pampean flat slab and addressing a conflict between the predicted and the observed: AGU Fall Meeting 2016.
- Brembs, R.G., and **Pietras, J.T.**, 2016, Cyclostratigraphy of the Parachute Creek Member: analysis of vertical and lateral facies and inorganic geochemical variability in the Green River Formation of the Uinta Basin, Utah: GSA Annual Meeting 2016.
- Miserendino, D., and **Pietras, J.T.**, 2016, Detailed sedimentology and inorganic and inorganic geochemistry of the Dolgeville Formation and Utica Group of the Central Mohawk Valley, NY: GSA Annual Meeting 2016.
- Tufano, B.C., and **Pietras, J.T.**, 2016, Depositional environment map of the Canadian Cordilleran Foreland Basin in the Middle Aptian: AAPG Annual Convention 2016.
- Pietras, J.T.**, Johnston, D., and Greene, C.M., 2015, Inexpensive workflow to produce high quality 3D models for geoscience education and research, GSA Annual Meeting 2015.
- Spiegel, E.B., and **Pietras, J.T.**, 2015, Chemostratigraphy of the Ordovician Trenton and Utica Groups: a continuum of facies relationships between carbonate shelf, slope, and basin deposits in Central Mohawk Valley, NY: GSA Annual Meeting 2015.
- Tufano, B.C., and **Pietras, J.T.**, 2015, Modeling regional versus local subsidence in the Canadian Cordilleran Foreland Basin: GSA Annual meeting 2015.
- Pietras, J.T.**, Kenyon, R., and Jagniecki, E., 2015, What's up with the paleo-high in Lake Gosiute?: ILIC 6.
- Kenyon, R., and **Pietras, J.T.**, 2015, Depositional model of a lacustrine delta, the Farson Sandstone Member of the Eocene Green River Formation, southwestern Wyoming, USA: AAPG Annual Convention 2015.
- Pietras, J.T.**, Lowenstein, T.K., Demicco, R.V., and Kenyon, R., 2014, Stratigraphic indicators to the cause of lake basin evolution in marginal lacustrine and fluvial deposits: GSA Annual Meeting 2014.

**CURRICULUM VITAE**  
**JONATHAN P. SCHMITKONS**  
*Environmental Geoscience Professor*

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**CONTACT INFORMATION**

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Science 1 Room 141B  
4400 Vestal Pkwy E.  
Binghamton, NY 13902

Email: jschmitk@binghamton.edu  
Phone: (315) 559-3179

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**EDUCATION**

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**Binghamton University**

*Binghamton, New York*

Major GPA: 3.962

**Certificate**

Advisor: Dr. Joseph Graney

**Ph.D.** in Geological Sciences

*Spring 2016*

Watershed Studies and Management

*Spring 2016*

Dissertation Title: Deposition, Transport, and Fate of Traffic Derived Pollutants in the Binghamton, NY Urban Corridor

**Calvin College**

Science

*Grand Rapids, Michigan*

Major GPA: 3.800

**B.S.** in Geology/Earth

*May 2008*

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**EMPLOYMENT**

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**Binghamton University**

*State University of New York Freshman Research Immersion (FRI)*

**Aug 2016-Present**

*Binghamton, New York*

**Research Assistant Professor**

- Developed a Biogeochemistry Curriculum-based Undergraduate Research Experience (CURE)
- Established and managed FRI biogeochemistry lab, trained students, and maintained instrumentation:
  - Atomic Emission Spectrometer (AES)
  - Ion Chromatograph (IC)
  - CHNS Element Analyzer
  - Automated Titrating Station
  - Axio Scope & Stereo Digital Microscopes
- Yearly teaching load:
  - Freshman Research Methods Seminar
  - Biogeochemistry Research Stream Part 1
  - Biogeochemistry Research Stream Part 2
  - Summer Research Experience for 8 rising sophomore students funded by NSF GEOPATH grant
- Projects managed:
  - Effects of Antibiotics on Nitrogen Cycling
  - Formation of 500 Ma Stromatolites at Petrified Sea Gardens
  - Biogeochemistry of Meromictic Green Lake
  - Effects of Particle size on Metal Storage in Wetland Retention Structures
  - Microbial Respiration of Arsenic and Antimony
  - Biotic and Abiotic Mechanisms of Bioherm Formation
  - Determining the Effectiveness of Lichens as Environmental Monitors
  - Hydrogeochemical Analysis and Closed System Modeling of Glacier Lake for Verification of Meromixis
  - Oxidation of Sulfur, Arsenic, and Antimony by Purple Sulfur Bacteria

○ The Effects of Deicers on Denitrification Rates  
Jonathan P. Schmitkons (continued)

**Clarion University of Pennsylvania**  
*Clarion University of Pennsylvania Department of Biology and Geosciences*  
**Geology Instructor** (temporary, full-time)

**Aug 2015-June 2016**  
*Clarion, Pennsylvania*

**SUNY Oneonta**  
*State University of New York at Oneonta Department of Earth and Atmospheric Sciences*  
**Water Resources Lecturer** (sabbatical replacement)

**Aug 2013-May 2014**  
*Oneonta, New York*

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## POSTERS PRESENTED AT PROFESSIONAL CONFERENCES

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- \* 2020 Graham, K., G. Laney, E. Intskirvelli, J. Lummerman, and J. Schmitkons, Calcium Carbonate Whiting Events in Fayetteville Green Lake: Biological or Geological Origin? **Geological Society of America Combined Northeast and Southeast Section Meeting**, Reston, VA. March 2020
- \* 2019 Ross, J., E. Chaves, S. Price, and J. Schmitkons, Geochemical Analysis and Closed System Modeling of Glacier Lake, NY for the Verification of Meromixis. **Geological Society of America Northeast Section Meeting**, Portland, ME. March 2019
- \* 2019 Cohen, S., W. Smisko, M. Harrison, A. Blumenthal, and J. Schmitkons, Determining the Effect of Tree Canopy and Lichen Species on Sorption Capabilities of Lichens. **Geological Society of America Northeast Section Meeting**, Portland, ME. March 2019
- \*2018 Berliner, J., J. Aguirre, J. Agueno, N. Willmart, J. Schmitkons, Common Antibiotic Sulfamethoxazole Disrupts Denitrification in Stream Sediment Microcosms. **Mid-Atlantic Chapter Meeting of the Ecological Society of America**. Rutgers, NJ, April 2018
- \*2018 Knoell, D., O. Lopez, M. Poggioli, D. Stokes-Malave, E. Wallace, and J. Schmitkons, Geochemical Modeling of Meromictic Green Lake, Fayetteville, NY. **Geological Society of America Northeast Section Meeting**, Burlington, VT. March 2018
- \*2018 Rogers, M., K. Weil, D. Leather, B. Sauerwald, A. Sheinbaum, and J. Schmitkons. Microbial Cycling of As and Sb in Contaminated and Pristine Environments. **Geological Society of America Northeast Section Meeting**, Burlington, VT. March 2018
- 2017 Schmitkons, Jonathan; Graney, Joseph; Fegley, Megan; and Stamp, Nancy; Establishing a Series of Three CURE Courses in Biogeochemistry **2017 Earth Educators' Rendezvous**, Albuquerque, NM. July 17-21
- 2017 Meindl, George; Light, Caitlin; Schmitkons, Jonathan; Stamp, Nancy; and Fegley, Megan; Freshman Research Immersion (FRI): a Model for Infusing Research into STEM Education 2017 **Gordon Research Conferences Undergraduate Biology Education Research**, Easton, Ma. July 9-14

\* Indicates Student Poster

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## PAPERS PRESENTED AT PROFESSIONAL CONFERENCES

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- 2018 Schmitkons, Jonathan and Graney, Joseph, The Biogeochemistry Freshman Research Immersion Program at Binghamton University. **2018 GSA Annual Meeting**, Indianapolis, IN. Nov 4-7
- 2013 Schmitkons, Jonathan and Graney, Joseph, The Spatial Distribution of Traffic Derived Pollutants in Several Types

of Stormwater Retention Structures in Urban Areas Near Binghamton, NY. **2013 GSA Annual Meeting**, Denver, CO. Oct 27-30

Jonathan P. Schmitkons (continued)

- 2012 Schmitkons, Jonathan and Graney, Joseph, Geochemical Mechanisms Controlling the Spatial Distribution of Near-Roadway Pollutants in an Urban Ecosystem. **2012 GSA Annual Meeting**, Charlotte, NC. Nov 4-7
- 2011 Schmitkons, Jonathan, Graney, Joseph, and Zhu, Weixing, Factors Influencing Metal Deposition and Mobility Near Roadways in the Binghamton, New York Urban Corridor. **2011 GSA Annual Meeting**, Minneapolis, MN. Oct 9-12
- 2011 Schmitkons, Jonathan, Graney, Joseph, and Zhu, Weixing, Near-Roadway Deposition Gradients in the Binghamton, NY Urban Corridor. **2011 GSA Northeastern and North-Central Joint Meeting**, Pittsburgh, Pa. March 20-22
- 2008 Schmitkons, Jonathan, Geurink, Brent, VanHorn, Jason, and van Dijk, Deanna, Using a Geographic Information System to Map Patterns of Change in a Lake Michigan Coastal Dune System. **2008 Annual Meeting of the Michigan Academy of Science, Arts, and Letters**, Western Michigan University, March 7



# Benjamin W. Turnpenny

[bturnpen@binghamton.edu](mailto:bturnpen@binghamton.edu)

7309 Collins St.

Whitney Point, NY 13862

(315) 264-6070

## Current Employment

### Lecturer

August 2014-present

#### **Introduction to Chemistry Principles I & II (CHEM107/108)**

As a teaching faculty member at Binghamton University, I am currently lecturing Introduction to Chemistry Principles I & II, as well as in charge of the logistics for the courses. The courses have over 800 students enrolled, and I generally teach two large lecture sections of over 200 students. I work with other lecturers who teach the other sections of my course and make sure that we are all teaching at the same pace, and we collaborate to make sure the assessments are at an appropriate difficulty. I have also had experience teaching the smaller summer sessions of the class, and even picked up an extra section during the semester when needed.

As a lecturer, I have written the syllabus for every course semester. Before the semester begins, I also arrange and pick the homework assignments for the semester through LON-CAPA. I design and prepare the lecture slides for each chapter that is covered during the semester. I write the quizzes and exams that are then reviewed by the other lecturers to ensure that the testing level is appropriate for each assessment. I would hold weekly meeting with my head TAs to discuss logistics for the course and discuss if there were any issues in the course that needed to be addressed.

I hold weekly office hours to help and advise students in my course. I have also developed a special set of office hours that combines both in person and streaming office at the Center for Learning and Teaching. I would pick practice problems and walk the students through on how to solve the problems. These office hour sessions are recorded and posted for the students to be able to watch after as many times as they want.

#### **Practicum in College Teaching (CHEM391)**

The General Chemistry courses meet once a week for an assessment that is either a quiz or exam. For the assessment, I lead a group of graduate and undergraduate teaching assistants (around 50 in total) to proctor the students over several lecture halls and classrooms. Before the assessment, I would hold a pre-discussion meeting where I would train the TAs about different aspects of being a teacher. Some of the assessments are collaborative group activities, where I train the teaching assistants to facilitate the students by asking leading questions to guide them in the right direction. Following individual quizzes and collaborative group activities, the TAs and I would meet back and I would lead them in following the grading criteria for the assessment, and would answer any questions to make sure that all students were being graded consistently. Every semester, I was in charge of hiring the undergraduate TAs that would be working for me, and would conduct interviews for each student that applied.

#### **Senior Seminar (CHEM496)**

As an additional course to my teaching workload, this semester I am co-teaching the senior seminar course, which is required for Chemistry and Biochemistry majors to graduate. In the course, we teach the students about researching papers, writing research papers, and techniques in giving oral and poster presentations. We

also have been bringing in people to talk about different career paths, as well as sharing our own experiences, to help the students realize what opportunities there are upon completing undergraduate school.

## **Teaching Presentations**

### **Oral Presentations**

- 1) Benjamin W. Turnpenny, Alexsa S. Silva, Alex Haruk, Lynn Schmitt, "Integrating Multiple Office Hour Formats to Increase Accessibility for Students in Large Lectures." *Conference on Instruction & Technology*, Potsdam, NY, June 3, 2016
- 2) Benjamin W. Turnpenny, Eliud K. Mushibe, Alexsa S. Silva, "Benefits of an Introduction to College Chemistry Course to General Chemistry Students." *American Chemical Society 41<sup>st</sup> Northeast Regional Meeting*, Binghamton, NY, October 6, 2016
- 3) Benjamin W. Turnpenny, Alexsa S. Silva, Alex Haruk, Lynn Schmitt, "Integrating Multiple Office Hour Formats to Increase Accessibility for Students in Large Lectures." *Center for Learning and Teaching Events*, Binghamton, NY, November 18, 2016
- 4) Benjamin W. Turnpenny, Alexsa S. Silva, Alex M. Haruk, "Chemflix: A unique approach to combining traditional and online office hours for large lecture classes." *255<sup>th</sup> American Chemical Society National Meeting and Exposition*, New Orleans, LA, March 19, 2018

### **Poster Presentations**

- 1) Benjamin W. Turnpenny, Alexsa S. Silva, Clarice Kelleher, Steven C. Murphy, "How to Improve Retention in General Chemistry without Sacrificing Content and Depth." *Chemistry Education Research and Practice: Gordon Research Conference*, Lewiston, ME, June 18, 2019

## **Awards**

1. 2018 Services for Students with Disabilities Outstanding Faculty Recognition
2. American Chemical Society 2018 Local Section Outreach Volunteer of the Year

## **Additional Experience with Binghamton University**

### **Committees**

- 1) Undergraduate Program Committee – As part of this committee, I have helped to make decisions regarding the courses that are offered to undergraduate students. I have also organized an event for undergraduate chemistry majors to socialize and get to know one another.
- 2) Chemistry Outreach Program – I have volunteered to help at various outreach events where we set up demonstrations for kids at the mall or at their schools to learn more about chemistry and science. I made contact with the local professional baseball team to coordinate an outreach event at the stadium. I have organized and led one event at a local elementary that was very well received by the students. I have also arranged the Outreach Appreciation end of the year event where we celebrate everyone that volunteered for an outreach event.
- 3) American Chemical Society – Binghamton Local Section – Member at Large – As a member of the local section, I participated in monthly meetings where local section business was addressed. I coordinated

the Chemistry Café events where we would visit a local business that would demonstrate the science of their craft. Four events have been coordinated in the community and open to the public.

- 4) American Chemical Society 41<sup>st</sup> Northeast Regional Meeting 2016 – I served as the webmaster, where I set up and designed the webpage. Whether it was the registration dates, an event that needed to be posted, or a way to easily navigate through the program, I worked on making the webpage fully functional. I also designed the flyers and business card advertisements to help publicize the event.
- 5) myCourses Users Group Chair – In Fall of 2017, I was appointed as the chair for the myCourses Users group, where Faculty, the Center For Learning and Teaching (CLT), and Information for Technology Services (ITS) meet biweekly to discuss new developments for the learning management system (LMS)
- 6) LMS Pilot Committee – due to the consideration of the myCourses Users Group, a pilot for a potential change in the learning management system was created, and serving on the committee, the discussion of how the implementation of the campus is deliberated
- 7) Go Green – 2015 – I was the Chemistry Science coordinator for the Go Green camp for kids entering the sixth grade. I planned activities for groups of students to work on the educated about different aspects of preserving the environment and sustainability. I also advised a group of students to help develop their own experiment that observed what metals would work best for a solar cell.
- 8) Hiring Committee – I have served on the hiring committees for the following positions:
  - a. General Chemistry Lecturer
  - b. Organic Chemistry Lecturer
  - c. Classroom Support Technician

### **Volunteer**

- 1) Science Olympiad
- 2) Chemistry Outreach at the mall
- 3) Chemistry Outreach for University Days
- 4) Chemistry Outreach at Tioga Hills
- 5) Admitted Students Open House

### **Faculty Advisor**

- 1) Pre-SOMA – Student Osteopathic Medical Association at Binghamton University
- 2) Phi Delta Epsilon – International Medical Fraternity at Binghamton University

### **Previous Teaching Experience**

#### **Adjunct Chemistry Professor**

**Jan 2014-May 2015**

I kept the information fresh and interesting for the students to keep their attention, and work out problems with students during class to fully engage them on what the problems are asking, as well as how to solve the problems. I provide lectures that are comprehensive on the material that is covered in the homework, and test the students with quizzes and tests. I hold office hours during the week for individual students that need extra assistance for areas that they may not have fully understood during the lecture. The students also learn applicable Chemistry techniques with labs that are attended on a weekly basis.

#### **Teaching Assistant**

Department of Chemistry, University at Buffalo  
General Chemistry I Laboratory (CHE 101)  
Advanced Organic Chemistry (CHE 455)

**Aug 2008-Dec 2009**  
**Jan 2010-May 2010**

**Responsibilities as Teaching Assistant**

I conducted 60 minute recitations before directing a 3 hour laboratory session where the students would conduct their experiments. The size of the classes for the labs ranged from 18-42 students. During the recitation, I would answer any questions that the students had from their studies, reviewed what was to be completed in the lab, discussed the calculations and analysis they would have to do for their post lab reports, heavily emphasized proper safety precautions, and quizzed the students about the lab. The lab portion of the class was always done under a strict and safe atmosphere where I would demonstrate to everyone any new techniques they would need to perform, and would circulate through the lab to help those that needed extra attention. Before exams, I would arrange long review sessions for the students that were interested in getting extra help to work out any issues they were having in their studies.

**Education****Ph.D. in Chemistry**

Aug 2008-Feb 2014

University at Buffalo, The State University of New York – Buffalo, NY

Dissertation Title: *Copper(II) Catalyzed Enantioselective Intra/Intermolecular Diamination And Hydroamination Of Alkenes*

Advisor: Dr. Sherry Chemler

**B.S. in Chemical Engineering**

Aug 2003-May 2007

**Concentration in Biomolecular Engineering**

Clarkson University – Potsdam, NY

**Research Experience****Thesis Focus:**

My research is focused on the difunctionalization of alkenes, which is an efficient route to reach synthetic targets. By taking advantage of the  $sp^2$  hybridized carbons of the double bond, one is able to add two atoms vicinally to a molecule. The diamination and hydroamination of alkenes can form products that are prevalent in natural products and biologically active compounds. The methodology that I have worked on has been focused making the reactions catalytic and enantioselective.

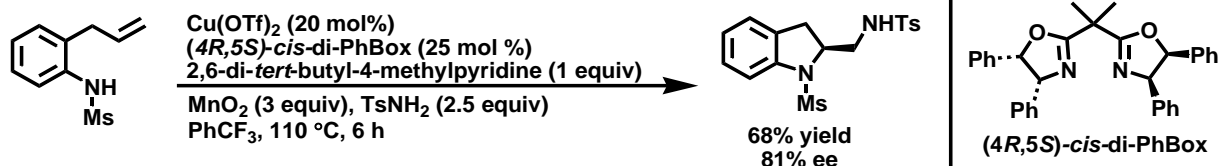
**Research and Project Accomplishments:***Copper Catalyzed Enantioselective Diamination of Alkenes*

- 1) Before my research, there had not been reported a catalytic enantioselective diamination of alkenes; other catalytic diaminations used expensive and toxic conditions
- 2) I optimized conditions of the copper promoted intra/intermolecular diamination to be catalytic and was able to publish the first catalytic enantioselective diamination of alkenes (*Sequeira, et al; Ang.Chem. Int. Ed.* 2010, 49 (36), 6365-6368)
- 3) Using a chiral bisoxazoline ligand to precomplex with the copper catalyst, I was able to achieve a catalytic enantioselective diamination of alkenes with a 68% yield and 81% ee (Scheme 1)
- 4) I was able to reduce the time for the diamination from 24 h down to 6 h for Scheme 1
- 5) To increase the ee% of the reaction, a bulkier di-*meta-t*-butyl *para*-methoxy aryl functional group was added to the nitrogen, which can be used with aniline or aliphatic substrates increases the ee%, but decreases the yield
- 6) A higher catalyst and ligand loading was initially needed to produce comparable yields and increased the enantioselectivity, until I optimized the conditions by introducing catalytic  $KMnO_4$  to help oxidize the reaction.

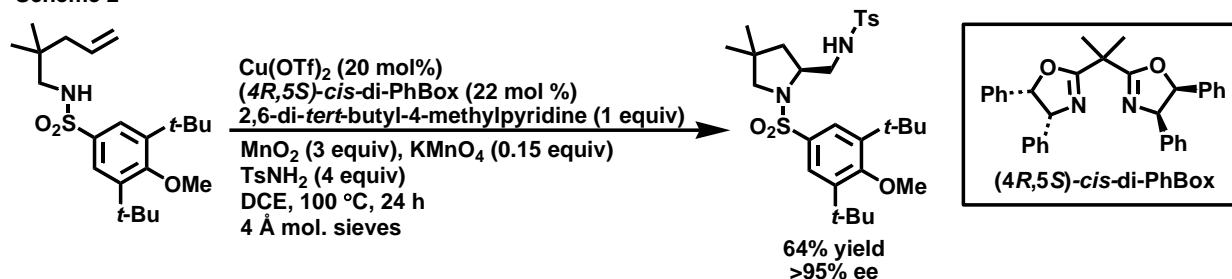
This allowed me to reduce the catalyst loading down to 20-25 mol%, which gave comparable yields to Scheme 1, as well as >95% ee for the aliphatic substrate (Scheme 2) and 86% ee for the aniline substrate (Scheme 3)

7) The expansion of the substrate scope and nucleophile scope is currently being developed for publication

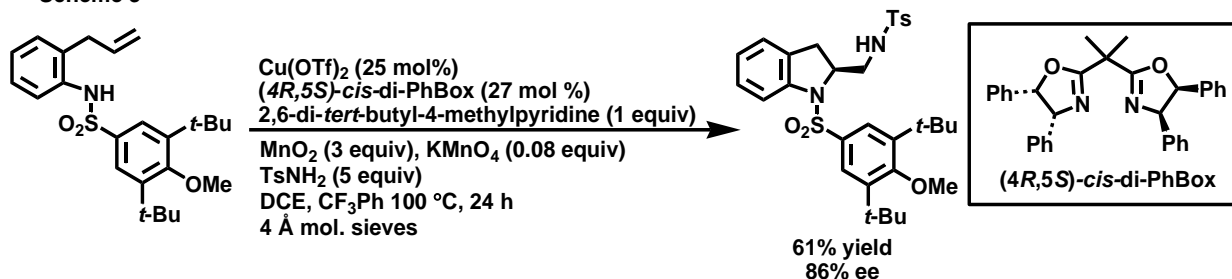
Scheme 1



Scheme 2



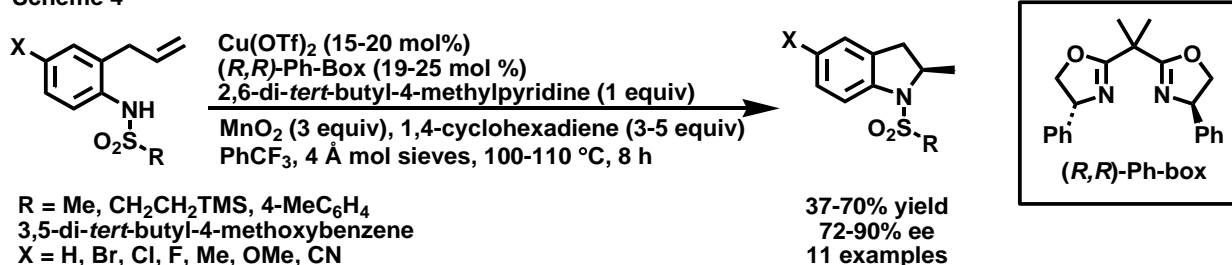
Scheme 3



#### Copper Catalyzed Enantioselective Hydroamination of Alkenes

- 1) Previous work done for synthesizing 2-methylindolines used expensive and toxic methods and did not provide sufficiently high ee%
- 2) Our research developed the first copper-catalyzed enantioselective alkene hydroamination/cyclization (Scheme 4)
- 3) Method provides an efficient route to enantioselective 2-methylindolines, which are found in medicinal chemistry
- 4) This method provides the highest enantioselectivities for the formation of 2-methylindolines

Scheme 4

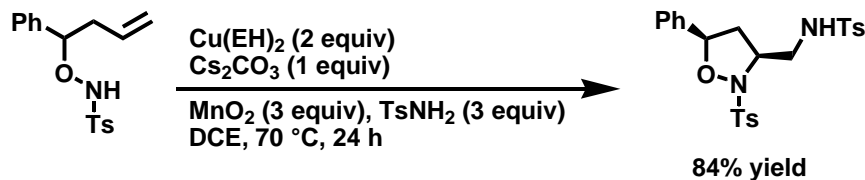


#### Formation of Isoxazolidines by Copper Promoted Diamination of Alkenes

- 1) I have instructing and guiding several undergraduates in research in developing an efficient route to the formation of isoxazolidines
- 2) This reaction is a copper promoted reaction that results in high yields (Scheme 5)

- I have mentored the undergraduates in developing laboratory skills such as running reactions, purifying products, and analyzing their data
- The expansion of the substrate scope and nucleophile scope is currently being worked on for this project

**Scheme 5**



### Research Publications

#### *Copper-Promoted and Copper-Catalyzed Intermolecular Alkene Diamination*

- Sequeira, F.; Turnpenny, B.; Chemler, S.; *Ang.Chem. Int. Ed.* **2010**, 49 (36), 6365-6368.

#### *Chiral Indoline Synthesis via Enantioselective Intramolecular Copper-Catalyzed Alkene Hydroamination*

- Turnpenny, B.; Hyman, K.; Chemler, S.; *Organometallics*, **2012**, 31 (22), 7819–7822.

#### *Copper-Catalyzed Alkene Diamination: Synthesis of Chiral 2-Aminomethyl Indolines and Pyrrolidines*

- Turnpenny, B.; Chemler, S.; *Chem. Sci.* **2014**, 5, 1786-1793.

### Research Presentations

#### **Oral Presentations**

- Benjamin W. Turnpenny, Kianté L. Hyman, Sherry R. Chemler, "Chiral Indoline Synthesis Via Enantioselective Copper-Catalyzed Alkene Hydroamination/Cyclization." *American Chemical Society 38<sup>th</sup> Northeast Regional Meeting*, Rochester, NY, October 2, 2012
- Benjamin W. Turnpenny, Sherry R. Chemler, "Intra/Intermolecular Copper (II) Catalyzed Diamination of Alkenes." *Organic Chemistry and Chemical Biology Seminar Series*, University at Buffalo, Buffalo, NY, April 17, 2012
- Benjamin W. Turnpenny, Sherry R. Chemler, "Intra/Intermolecular Copper (II) Catalyzed Diamination of Alkenes." *Graduate Student Symposium*, University at Buffalo, Buffalo, NY, May 13, 2011
- Benjamin W. Turnpenny, Fatima C. Sequeira, Sherry R. Chemler, "Intra/Intermolecular Copper (II) Catalyzed Diamination of Alkenes." *Graduate Student Symposium*, University at Buffalo, Buffalo, NY, May 11, 2010

#### **Poster Presentations**

- Benjamin W. Turnpenny, Sherry R. Chemler, "Intra/Intermolecular Copper (II) Catalyzed Diamination of Alkenes." *Graduate Student Symposium*, University at Buffalo, Buffalo, NY, May 17, 2012
- Benjamin W. Turnpenny, Sherry R. Chemler, "Intra/Intermolecular Copper (II) Catalyzed Diamination of Alkenes." *Quebec-Ontario Mini-Symposium on Bioorganic and Organic Chemistry (QOMSBOC)*, Brock University, St. Catharines, Ontario, Canada, November 12-14, 2010

## Carlos Vega

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Contact	Binghamton University (SUNY) Department of Mathematics 4400 Vestal Parkway East Binghamton, New York 13902	(607) 777-6035 vega@math.binghamton.edu
Interests	Differential, Riemannian, and Lorentzian geometry, mathematical relativity	
Positions	<b>Binghamton University</b> Allen Ziebur Assistant Professor, as of Fall 2017  <b>Saint Louis University</b> Postdoctoral Fellow, Fall 2014-Spring 2017  <b>Graduate Center, City University of New York (CUNY)</b> Visiting Research Postdoc, Spring 2014 Mentor: Christina Sormani (funded by NSF-DMS)  <b>Mathematical Sciences Research Institute (MSRI)</b> Postdoctoral Fellow, Mathematical General Relativity Program, Fall 2013 Program Mentor: Hans Ringström	
Education	<b>University of Miami</b> Graduate Teaching Assistant Ph.D., Mathematics, August 2013 Advisor: Gregory J. Galloway Thesis: <i>New Approaches to Spacetime Rigidity and Splitting</i>  <b>Michigan State University</b> Graduate Teaching Assistant M.S., Mathematics, May 2009  <b>Florida International University</b> Double B.S., Physics and Mathematics, May 2005	
Publications	<i>Achronal limits, Lorentzian spheres, and splitting</i> , G. J. Galloway and C. Vega, <i>Annales Henri Poincaré</i> , 15 (2014) 2241-2279, arXiv: 1211.2460  <i>Null distance on a spacetime</i> , C. Sormani and C. Vega. <i>Classical and Quantum Gravity</i> , 33, (2016), 085001, arXiv: 1508.00531  <i>Hausdorff closed limits and rigidity in Lorentzian geometry</i> , G. J. Galloway and C. Vega. <i>Annales Henri Poincaré</i> , 18 (2017) 3399-3426 arXiv: 1608.06353  <i>Rigidity in vacuum under conformal symmetry</i> , G. J. Galloway and C. Vega. <i>Letters in Math. Phys.</i> 108 (2018) 10, 2285-2292 arXiv: 1712.00785	
Teaching	<b>Binghamton University</b> <i>Intro to Calculus</i> (2 sections, co-coordinator) <i>Calculus I</i> (2 sections, as primary coordinator) <i>Calculus II</i> (1 section as co-coordinator, 5 sections as primary coordinator) <i>Complex Variables</i> (2 sections)	

**Saint Louis University** *Calculus I* (5 sections) *Calculus III* (8 sections)  
*Differential Equations* (4 sections)  
*Nonlinear Dynamics and Chaos* (1 section)

**Park City Mathematics Institute (PCMI) 2013**  
Teaching Assistant: *Curvature of Space and Time*

**University of Miami**  
*Introductory Calculus* (3 sections)

**Miami Dade College**  
*Business Calculus* (3 sections) *College Algebra* (2 sections) *Finite Math I* (1 section) *Finite Math II* (2 sections)

**Michigan State University** *Survey of Calculus* (10 sections) *College Algebra* (1 section) *Finite Math* (1 section)

Select Talks

*Splitting Spacetime: Lorentzian Horospheres*, Union College Mathematics Conference, Union College, Sep 2019

*Splitting Spacetime*, A Celebration of Mathematical Relativity in Miami, in Honor of Greg Galloway's 70th birthday, University of Miami, Dec 2018

*Lorentzian Distance and the Cosmological Time Function*, Spring School on Geometric Aspects of General Relativity, Simons Center for Geometry and Physics, Mar 2018

*Null Distance on a Spacetime*, Geometry and Topology Seminar, Binghamton University, Feb 2018

*Spacetime Rigidity and Splitting*, AMS Sectional Meeting, Special Session on Geometric Analysis and General Relativity, College of Charleston, March 2017

*Null Distance on a Spacetime*, AMS Sectional Meeting, Special Session on Mathematical General Relativity, Stony Brook University, March 2016

*Null Distance on a Spacetime*, Geometry, Groups, and Dynamics Seminar, University of Illinois Urbana-Champaign, Fall 2015

*Null Distance on a Spacetime: Parts I and II*, Geometry/Topology Seminar, Saint Louis University, Fall 2015



*Lorentzian Horospheres and Bartnik's Splitting Conjecture: Parts I and II*, Geometry/Topology Seminar, Saint Louis University, Spring 2015

*Generalized Lorentzian Horospheres and Bartnik's Splitting Conjecture*, Differential Geometry Seminar, University of Illinois Urbana-Champaign, Spring 2014

*Lorentzian Horospheres and Bartnik's Splitting Conjecture*, Differential Geometry Seminar, CUNY Graduate Center, Spring 2014

*Rigidity, Singularities, and Lorentzian Splitting Geometry*, MSRI Postdoctoral Seminar, UC Berkeley, Fall 2013

*Bundles and Connections*, Topological Quantum Field Theory Seminar, University of Miami, Fall 2011

*The Gromov-Hausdorff Topology: Taking Limits of Riemannian Manifolds*, Graduate Student Seminar, University of Miami, Fall 2011

*Walkable Spacetimes*, Graduate Student Seminar, University of Miami, Spring 2011

*Spacetime, Singularities, and the Bartnik Conjecture*, Graduate Student Seminar, University of Miami, Fall 2010

*How to Bury Dirt: Optimal Transport*, Graduate Student Seminar, Michigan State University, Fall 2008

## Conferences & Workshops

Union College Mathematics Conference, Union College, Sep 2019

A Celebration of Mathematical Relativity in Miami, in Honor of Greg Galloway's 70th birthday, University of Miami, Dec 2018

Mass in General Relativity, Simons Center for Geometry and Physics, March 2018

AMS Sectional Meeting, Special Session on Geometric Analysis and General Relativity, College of Charleston, March 2017

BIRS Workshop on Geometric Analysis and General Relativity, Banff, July 2016

Workshop on Aspects of General Relativity, CMSA, Harvard, May 2016

AMS Sectional Meeting, Special Session on Mathematical Relativity, Stony Brook University, March 2016

Initial Data and Evolution Problems in General Relativity, MSRI, Fall 2013

Introductory Workshop: Mathematical General Relativity, MSRI, Fall 2013

Connections for Women: Mathematical General Relativity, MSRI, Fall 2013

Graduate Summer School in Geometric Analysis, PCMI, Summer 2013

Summer Graduate Workshop in Mathematical General Relativity, MSRI, July 2012

## References

**Dr. Gregory J. Galloway**, (PhD advisor), Professor of Mathematics, University of Miami, (305)-284-2348, g.galloway@math.miami.edu

**Dr. Christina Sormani**, (Postdoc Mentor), Professor of Mathematics, CUNY Graduate Center, (718)-960-7422, sormanic@member.ams.org

**Dr. Stacey (Steve) Harris**, (Research Reference), Professor of Mathematics, Saint Louis University, (314)-977-2439, harrissg@slu.edu

**Dr. James Hebda**, (Teaching Reference), Professor of Mathematics, Saint Louis University, (314)-977-2444, hebda@slu.edu

**Dr. Brody Johnson**, (Teaching Reference), Associate Professor of Mathematics, Department Associate Chair, Saint Louis University, (314)-977-2484, brody@slu.edu

# Erik M. Weiler

## Work Experience

August 2016 to Present

### **Binghamton University (SUNY), Binghamton, NY**

#### *Adjunct Professor – General Physics I and General Physics II*

- *Prepared and executed 28, 1.5-hour lectures during each semester; was responsible for teaching around 100 students in each lecture.*
- *Created exam content from scratch, which was used as the primary means to evaluate student comprehension of course material.*
- *Responsible for recording, calculating and submitting course grades (i.e. exam scores, lecture participation scores and discussion scores).*
- *Responsible for special accommodation students, which requires working with several departments (and the students) to reserve a time and location suitable for their special exam-taking needs.*

#### *Assistant Instructor – Sophomore Laboratory and Junior Laboratory*

- *Assisted lead instructor of the course; was responsible for helping students with executing laboratory experiments, grading laboratory notebooks and coordinating oral presentations during each semester.*
- *Responsible for recording, updating, and calculating course grades (i.e. laboratory report scores, laboratory notebook scores and oral presentation scores).*

September 2012 to June 2016

### **Seton Catholic Central High School, Binghamton, NY**

#### *High School Physics Teacher – AP Physics and NYS Regents Physics*

- *AP Physics: taught lectures and labs to 16 high school students; was responsible for creating course content (i.e. lecture slides, laboratory procedures, demos, homework assignments, and exams/quizzes).*
- *NYS Regents Physics: taught lectures and labs to 20 high school students; was responsible for creating all course content.*
- *Highly appreciated by students for offering them “a new perspective into the world of science” and for “making physics fun to learn” (as they kindly stated was the case in their 2014 senior class yearbook).*

January 2010 to August 2014

### **Binghamton University (SUNY), Binghamton, NY – Graduate School**

#### *Course Assistant – Quantum Mechanics I and Statistical Thermodynamics*

- *Guest-lectured for several classes during the semester (as requested by advisor) to further develop teaching skills; was solely responsible for all grading (i.e. exams/quizzes and solution sets to homework).*

#### *Course Assistant – Electromagnetic Theory I and Analytical Mechanics*

- *Held (non-required) office hours* to provide students with additional instruction; was solely responsible for all grading (see previous).

*Teaching Assistant – General Physics I and General Physics II*

- *Led two discussion sections* each semester (with roughly 30 students in each section); was responsible for reinforcing lecture concepts by solving problems in class; held office hours and helped grade exams.

January 2006 to  
October 2009

**Lockheed Martin Systems Integration, Owego, NY**

*Systems Engineer – VH-71 Presidential Helicopter Program*

- *Developed and maintained software requirements* for the VH-71 presidential helicopter radio communications subsystem.
- *Consulted and worked with software engineers* to implement and/or update software requirements according to specification documents.
- *Performed integration and test procedures* on radio communications subsystems in software laboratory and VH-71 (mock-up) helicopter.
- *Granted Secret clearance* required to perform job-related tasks.

**Education**

May 2011 to  
August 2014

**Binghamton University (SUNY), Binghamton, NY**

Ph.D., Theoretical Physics

January 2010 to  
May 2011

**Binghamton University (SUNY), Binghamton, NY**

M.S., Physics, 3.94 GPA

August 2004 to  
December 2005

**University at Albany (SUNY), Albany, NY**

B.S., Physics, *Cum Laude*

Minor in *Mathematics and Statistics*

August 1999 to  
May 2003

**University at Albany (SUNY), Albany, NY**

B.S., Atmospheric Science, *Cum Laude*

Minor in *Computer Science*

**Software Proficiency**

*Highly experienced with the following programs:*

- Microsoft Word
- Microsoft Excel
- Microsoft PowerPoint
- Microsoft Outlook
- Microsoft Paint