Sabbatical Leave Application Checklist
Submit one hardcopy to Provost Office

***The SaLe Committee will not consider incomplete applications***

Cover Sheet -- Includes the following:

- [ ] Dates of Proposed Sabbatical
- [ ] Applicant’s Signature
- [ ] Years of Service/Eligibility Points
- [ ] Dept. Chair’s Signature
- [ ] Dean’s Signature

[ ] Curriculum Vitae -- Must not be longer than 8 pages.

Narrative -- Describe the proposed project using the areas indicated in the application form:

PLEASE NOTE: Your proposal should be written in clear, correct English that is understandable to an educated layperson.

- [ ] Clear, concise statement of objectives (approx. 300-400 words)
- [ ] Detailed description of project (approx. 1,500 words)
- [ ] Relationship of project to current work assignment (approx. 400-500 words)
- [ ] Projected timeline for the project (approx. 100-200 words)
- [ ] Tangible product or results of the project (approx. 200-300 words)
- [ ] Expected benefits of the project to discipline and University (approx. 200 words)
- [ ] Likelihood of completion of project (approx. 200 words)
- [ ] Description of meritorious service (approx. 600-800 words)

[ ] Budget -- Where appropriate, to detail expenses for equipment, student support, etc.

[ ] Letters of support -- Where appropriate, to affirm the significance and feasibility of the project.

For example, letters might be appropriate
• To document the value and nature of a collaboration or of a location, the availability of resources, or the feasibility of the project;
• To document access to a restricted archive or library or the importance of the work to be undertaken.

N/A Final report(s) of any previous sabbatical leave(s) has/have been filed

[ ] All Required Signatures

Please see the Sabbatical Leave Policy and form on the Provost’s website for further description. For any questions, please contact the Chair of the SaLe Committee.
West Chester University of Pennsylvania
APPLICATION FOR SABBATICAL LEAVE
Submit one hardcopy to Provost Office

Martin F. Helmke
Name

Geology and Astronomy
Department

03/09/2016
Date

1. Sabbatical Request (Select one):
   - [ ] 1 year at ½ salary
   - [✓] 1 semester at full salary

Sabbatical to begin ___________________ and end ___________________
   August 2017

Eligibility. The general rule of thumb is that you need 7 years of full-time service as a regular (permanent) faculty member for each sabbatical, but, you do not need to wait 7 years between sabbaticals. You cannot, however, apply any earlier than four semesters following the semester in which a previous sabbatical has been taken. To help ensure that you have enough years of service to qualify for a sabbatical, answer the following questions:

- Year you began as a full-time regular (permanent) faculty member in the PaSSHE (Note: policy requires that you have at least five consecutive years of service at WCU)

- Give yourself one (1) seniority point for each semester of service

- Subtract 14 points for the most recent sabbatical you have taken (skip this step if you have never had a sabbatical)

- Divide the remaining number of seniority points by two (2) to convert semesters to years.

(Also note: You do not have to wait until you have completed 7 years of service to apply; you do, however, need to make sure that you will have completed 7 years of service before you take the sabbatical. Because applications must be submitted at least two semesters (spring leave) or three (fall leave) semesters in advance, you can count those semesters as part of your required years of service).

Proposal Submission. The Faculty member is responsible for ensuring that Chairperson’s and Dean’s comments and signatures are forwarded on time, and that the completed proposal (hardcopy) is delivered to the Provost’s Office by the published deadline. Incomplete applications or applications received after the published deadlines will not be reviewed by the S&L Committee.

I certify that the information I have presented is accurate and contains no omission of fact.

[Signature]
Applicant’s signature

3/10/2016
Date
2. Clear, concise statement of objectives (approx. 300-400 words):

Project Title: Creation of the WCU Groundwater Modeling Center to Apply Unstructured Grid Technology to Protect Water Quality

The overall objective of this sabbatical project is to create a Groundwater Modeling Center (GMC) at WCU, dedicated to applying cutting-edge groundwater modeling techniques to support hydrogeologic investigations for community outreach. Our group will specialize in the use of Unstructured Grid (USG) technology, which is a brand-new, innovative numerical technique that has the potential to revolutionize the way hydrogeologists solve groundwater flow problems. These simulations will be applied to help scientists and communities solve real-world problems such as water availability, groundwater pollution, groundwater remediation, wastewater management, and human impact on aquatic ecosystems. This project will engage undergraduate and graduate students in applied research that will lead to publication in peer-reviewed journals. Methods perfected will be used to develop course content for our recently-approved graduate course ESS 549 Advanced Hydrogeology.

Specific objectives of this initiative include:

1. Create the WCU Groundwater Modeling Center.

2. Apply the USG technique to two well-established case studies: a) investigate stream impact from a large commercial well on Broad Run in Southern Chester County, Pennsylvania, and b) evaluate the potential for groundwater contaminants from the Tremont City Landfill to impact drinking water quality in Springfield, Ohio.

3. Involve both undergraduate and graduate students in applied groundwater modeling research.

4. Work with undergraduate and graduate students to write a manuscript on applied USG simulation to be submitted to a peer-reviewed journal.

5. Develop course content for ESS 549 Applied Hydrogeology, specifically exercises in a) applying the USG method, b) USG contaminant transport, c) groundwater/surface water interaction, d) discrete flow system analysis, and e) inverse modeling and parameterization techniques.

Numerous benefits will be realized by this project, including:

1. The WCU Groundwater Modeling Center will demonstrate WCU's commitment to science excellence and outreach. The WCU GMC will engage in outreach activities with citizen groups, geoscience consulting firms, government agencies, and K-12 institutions. The national-focus of the Center will expand WCU's reach beyond the Greater Philadelphia Region.

2. Application of contemporary groundwater simulation techniques to solve hydrogeologic problems will result in innovative new approaches that will advance the state of the science forward and will directly benefit communities who are concerned about their groundwater.

3. Undergraduate and graduate students will benefit from the experience of conducting high-impact research using innovative technologies.

4. Submission of model analysis reports and a manuscript to a peer-reviewed journal will serve as excellent professional development for both me and my students.

5. Developing new course content for ESS 549 Advanced Hydrogeology will improve student performance as they enter the workforce and will increase the credibility of the new M.S. Geoscience curriculum.
The primary purpose of this sabbatical is to launch the WCU Groundwater Modeling Center. The mission of the WCU GMC will be to apply cutting-edge groundwater modeling techniques to support hydrogeologic investigations conducted by scientists and citizens to protect water quality. We will specialize in the USG method and will engage in community outreach with citizens groups, K-12 institutions, government organizations, hydrogeologic consulting firms, and peer academic institutions. The WCU GMC will initially be housed in the Department of Geology and Astronomy. I will serve as the first director, and the initial membership will include approximately four M.S. Geoscience and B.S. Geoscience students in the department. Over time, we anticipate adding faculty and students from across the University as the organization matures and grows.

The USG method is a computational technique developed by Dr. Sorab Pandey (Pandey et al., 2015) that employs a finite difference solver to simulate groundwater flow and contaminant transport through an unstructured grid of cells with arbitrary shape. This approach is taking the field by storm and has been endorsed by the Federal Government through the public-domain release of MODFLOW USG by the U.S. Geological Survey. Previous (structured) finite difference techniques required a regular, Cartesian grid of rows and columns that led to an unnatural discretization of the model domain. A USG, with its flexible geometry, allows cells to represent the 3-dimensional complexity of natural systems. Figure 1 illustrates how a USG, in this case using Voronoi polygons, provides a much more realistic representation of a 3-dimensional hydrostratigraphic system than the structured grid. Moreover, the USG requires far fewer grid cells, resulting in a significant reduction in computer run time.

Although many hydrogeologists have embraced the use of USG in their model simulations over the past year, few have published their results in peer-reviewed journals. One of the most widely-distributed periodicals, Groundwater, published by the National Groundwater Association, has only published 4 manuscripts on USG. To date, no studies have published the use of USG for contaminant transport. This underscores the opportunity for WCU to push the field forward by employing the USG technique and publishing in internationally distributed journals. Moreover, this project is readily feasible. WCU owns a site license for the world’s leading groundwater modeling package Groundwater Vistas, which includes the only version of MODFLOW USG that is capable of simulating contaminant transport coupled with groundwater flow. Additionally, WCU is located in a region that has a high density of intensely-studied sites that could benefit from groundwater flow and contaminant transport analysis.

Figure 1. Computer representation of a 3-dimensional groundwater flow system using a traditional grid and unstructured grid (USG). The USG more accurately represents the complex natural system and requires fewer cells, resulting in significant improvements in computational efficiency.

Tens of thousands of groundwater investigations are currently underway in the United States. Most of these case studies involve groundwater availability or sites where groundwater has been contaminated and citizens are concerned about the quality of their drinking water. All of these sites would benefit from the application of computer modeling techniques to quantify the complex, 3-dimensional flow of water and dissolved contaminants. Unfortunately, groundwater flow modeling is rarely employed due to a) lack of training, b) lack of funds necessary to support a rigorous scientific study (most model simulations require at least 100 hours of labor to construct), and c) a hesitation by regulators to require the application of such techniques. This presents a great opportunity to involve students in the application of modeling techniques because a) these case studies are abundant, b) students can dedicate the time to construct models, c) these research projects utilize existing field and analytical data, and d) by training the next generation of geoscientists in the use of modeling, the hydrogeology industry will more likely employ these robust techniques for future projects.
3. Detailed description of project (approx. 1,500 words) continued:

To “kick off” the WCU GMC, we have identified two case studies (the Broad Run Study and the Springfield Wellhead Protection Study) that a) have rich data sets ready to be used to construct USG models, and b) support non-profit citizens groups who are concerned about water quantity and quality. After these case studies are complete, we have future plans to work with the National Park Service (I have close ties to Dr. Ed Harvey, who is the Water Resources Division Chief of the National Park Service) and our numerous alumni who work for consulting firms, government agencies, and non-profits who are investigating contaminated groundwater sites throughout the Greater Philadelphia Region.

The Broad Run Study is located on Broad Run Creek in the White Clay Creek Watershed in southern Chester County, PA. Artesian Water, a water supply company based in Delaware, is planning to install a large production well located approximately 300 ft from Broad Run Creek (Demicco, 2014). Save Our Water, a local citizens group with over 1,000 members organized by Dr. Marion Weggoner and Dr. Dave Yake, is concerned that extracting water at a rate of 200 gallons per minute could de-water Broad Run Creek and impact private wells in the area. See their attached letter of support for this sabbatical project. All parties involved have collected a large body of data and have speculated about the potential impact of the well. However, only a computer model can incorporate the fascinating and complex 3-dimensional geology of the watershed, including the Cockeysville Marble, Wissahickon Schist, White Clay Creek Amphibolite, Baltimore Gneiss, a pegmatite body, a thrust fault, a strike-slip fault, and surficial soils. Adding to the complexity is an upstream reservoir and a municipal wastewater irrigation system. When the well is installed, well flow and upstream and downstream monitoring stations will be recorded, which will allow us to calibrate and validate our model. Although this is clearly a politically-charged project, our objective analysis will provide quantitative answers and potential solutions to challenges faced by all parties involved. The WCU GMC would work closely with Save Our Water, Artesian, and the Delaware River Basin Commission on this project.

The Springfield Wellhead Protection Study is located in Springfield, Ohio. A citizens group called People for Safe Water is concerned that chemicals from the Tremont City hazardous waste landfill, located 1 mile upgradient, could contaminate water supply wells for the City of Springfield with a population of 60,000. Our point of contact with this organization is Mr. Peter Townsend, a retired college professor and licensed professional geologist with whom I have worked with for over 25 years. See Mr. Townsend’s letter of support for this project. The objective of this study is to construct a USG groundwater flow model that incorporates the 3-dimensional geology to evaluate the likelihood of impact from the landfill. The geology of the area has been well-characterized and includes glaciofluvial deposits, multiple sequences of potentially fractured glacial tills, a regional carbonate aquifer, and the Mad River valley train deposits. We have a recently-updated series of lithologic contact maps to use to constrain our model boundaries. We also have access to a previous wellfield protection model that used a traditional structured grid approach (Smith, 2010). Our objective is to construct a USG model of the site and employ stochastic techniques to objectively evaluate the potential threat of the landfill. We will share our analysis with People for Safe Water, the City of Springfield, Ohio EPA, and consultants for the Tremont City Landfill.

Establishing the Groundwater Modeling Center is a means of strengthening WCU’s growing geoscience program. It will help to attract higher quality students and support our new M.S. Geoscience degree. Through our research, we will embody WCU’s commitment to public outreach and embrace our teacher, scholar, citizen model. I look forward to using this project as a vehicle for continuous, applied research for the rest of my academic career.

References:


4. Relationship of project to current work assignment (approx. 400-500 words):

This project directly supports my work assignment because it will enhance my ability to serve as the principal hydrogeology faculty member in the Department of Geology and Astronomy. The department has adopted a "Teacher Scholar Citizen" model that equally values teaching, research, and outreach in all aspects of our academic work. This sabbatical would enhance my hydrogeology teaching by allowing me to dedicate time to develop course content for ESS 549 Applied Hydrogeology, specifically exercises in a) applying the USG method, b) USG contaminant transport, c) groundwater/surface water interaction, d) discrete flow system analysis, and e) inverse modeling and parameterization techniques. Establishing the WCU Groundwater Modeling Center would provide almost limitless applied research opportunities for my research group. The use of USG techniques, especially in the field of contaminant transport, would most certainly contribute to the field of research hydrogeology on the international level and will lead to publication in well-respected peer-reviewed journals. Perhaps the most appealing aspect of this initiative is the outreach/service component. Assisting communities by providing high-quality, applied research is highly rewarding. By involving students and engaging community members in this work, we will promote the use of objective science and prepare the next generation of geoscientists for careers that serve the public good.
5. Projected timeline for project [if awarded, a detailed timeline will be requested approximately 3 months before sabbatical begins] (approx. 100-200 words):

We have already started this project by collecting background data and conducting a thorough literature review of both the Broad Run and Springfield Wellsfield Protection sites. I have also taken over 80 hours of training in the use of USG techniques this year. If approved, we will adopt the following timeline:

2016/2017 Academic Year: Work with the Dean to establish the WCU Groundwater Modeling Center. Select graduate and undergraduate students to participate in the research project. Educate students in the use of the USG technique.


September-October 2017: Complete USG models.

November 2017: Write and present summary reports to vested parties. Develop USG course content for ESS 549 Advanced Hydrogeology. Develop draft of applied USG manuscript.

December 2017: Complete draft manuscript for peer-reviewed publication. Submit final report to Provost’s Office.
6. Tangible product or results of the project (approx. 200-300 words):

Tangible products from this project will include:

1. Creation of the WCJ Groundwater Modeling Center. We will create a website that will announce the GMC's mission and showcase projects.

2. Publication and release of USG groundwater flow models for the Broad Run and Springfield Wellfield Protection case studies.

3. A manuscript focusing on applied USG modeling for publication in a peer-reviewed journal such as Groundwater.

4. A series of assignments and tutorials on the USG method for the ESS 549 Advanced Hydrogeology course.
7. Expected benefits of project to your department/unit, discipline, school/college, and university (approx. 200-300 words):

Creation of the WCU Groundwater Modeling Center will establish WCU as a leading institution of hydrogeologic research in the Philadelphia Region and beyond. Taking advantage of innovative new technologies such as unstructured grid modeling will garner respect for our work at the international level. Applying our research to support projects that affect communities will increase public awareness of how critical the geological sciences are to allow us to live sustainably on our planet. All of these elements will a) improve our ability to attract higher-quality undergraduate and graduate students into our geoscience programs, b) improve the reputation of the Department of Geology and Astronomy and College of Arts and Sciences at West Chester University and PASSHE, and c) increase our visibility as a regional comprehensive institution.
8. Likelihood of completion of project (approx. 200 words):

This project has a very high likelihood of completion. I have over 25 years of experience applying groundwater modeling techniques, including my PhD dissertation. I have spent the past year training by taking over 80 hours of USG groundwater modeling courses taught by world-class instructors Dr. Sorab Panday, the developer of MODFLOW USG, and Jim Rumbaugh, developer of the Groundwater Vistas software suite. I have already worked closely with parties involved with both the Broad Run and Springfield Wellfield Protection case studies and have already acquired most of the data necessary to construct the models. I have access to over 35 graduate and 140 undergraduate students, most of whom will have taken my hydrogeology courses and are pursuing careers as hydrogeologists. We have a site license for Groundwater Vistas, the leading software for simulating groundwater flow and contaminant transport using the USG method. A sabbatical would allow me to devote the time to bring this project to fruition. Once established, the structure of the WCU Groundwater Modeling Center would allow my group to continue our research after I resume my usual teaching and administrative duties.

9. Previous sabbatical(s):

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<tr>
<th>Year</th>
<th>Activity</th>
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<td>N/A</td>
<td>N/A</td>
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10. Previous AWA(s) for scholarly/creative endeavors:

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<tr>
<th>Year</th>
<th>Activity</th>
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<tbody>
<tr>
<td>N/A</td>
<td>To date I have not received AWA for scholarly activities</td>
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11. Description of Meritorious Service (approx. 600-800 words):
[Meritorious service is a critical component of a successful application for sabbatical leave. It includes activities that contribute significantly to the applicant's discipline, West Chester University, and the profession at large.]

The following examples are representative, but do not constitute a complete list:

1) Leadership positions:
   • Chairing university committees and departments;
   • Chairing professional association committees; and
   • Chairing committees that organize and plan local, regional, and national conferences.

2) Other significant activities:
   • Active participation on campus committees;
   • Contributions to academic and professional organizations beyond WCU;
   • Development of significant partnerships between the university and the community;
   • Retraining or developing new competencies to serve the university beyond the classroom; and
   • Specific and continuous service to students and student groups.

(N.B. meritorious service is to be presented by the applicant to the sabbatical-leave committee as a written justification statement by the applicant) (see, Sabbatical Leave Policies and Procedures, section D) click to view.

As illustrated by my CV, I have a strong record of meritorious service to the Department, University, and Discipline as follows:

Leadership Positions:
2014 to Present: Chair of the Department of Geology and Astronomy
2008 to Present: Director of the West Chester Geoscience Institute through the WCU Foundation
2012 to Present: Chair of the WCU Geothermal Research Group
2011 to Present: Trench Rescue Manager, Chester County Rescue Task Force
2013 to 2014: Elected to the Executive Board of the Pennsylvania Council of Professional Geologists
2014: Chair and Graduate Dean Representative, WCU Graduate Academic Integrity Board
2013-2014: WCU Service Learning Associate and Chair of the Service Learning Committee
2013-2014: Elected Member of the WCU Graduate Executive Committee

Other Significant Activities:
2014-pres. Member, WCU Course Scheduling Committee
2014-pres. Communications Committee, Pennsylvania Council of Professional Geologists
2014 Session Chair, "Groundwater Contamination and Remediation: Challenges and Innovative Solutions", Northeast Geological Society of America meeting, Lancaster, PA
2013-pres. Member, WCU Hazard Mitigation Committee
2013-pres. Member, WCU Disaster Response Committee
2013-2014 Member, WCU Graduate Thesis Ad-Hoc Committee
2013-2014 Elected Member, WCU Graduate Executive Committee
2012 Member, Search Committee for WCU Director of Service-Learning and Volunteer Programs
2012 Member, Search Committee for WCU Director of Graduate Admissions
2011-2014 Chair, MA Geoscience Graduate Committee
2010-2014 APSCUF state delegate
2010 Chair, Structural Geologist Search Committee
2008-pres. Member, Community Action Committee, Saratomer Chemical Facility, West Chester, PA
2008-2011 Chair, Department of Geology and Astronomy Curriculum Committee
2008 Session chair "Wastewater Recycling and Disposal in Diverse Environments: Challenges and Creative Solutions", National GSA and SSSA, Houston, TX.
2007-2009 Member, APSCUF Bylaws Committee
2006-pres. Appointed APSCUF representative, WCU Safety Committee
2006-May '08 Co-Chair, Department of Geology and Astronomy Assessment Committee
2005-pres. LGBTQIA Ally
2005-2008 Chair, Department of Geology and Astronomy Student Scholarship Committee
12. Attach current curriculum vitae, no longer than 8 pages. Attach letters of support (not required, but helpful).

13. Endorsements and Comments

a. ______ Joby Hilliker ______
   Chairperson
   03/10/2016
   Date

N.B. If the applicant is the Department Chair, this form must be signed by the Assistant Chair or, if there is no Assistant Chair, a senior tenured member of the Department.

Please comment below on how the sabbatical relates to the individual faculty member's assignment in the department as well as how the sabbatical relates to department goals or long range plans.

I strongly endorse Dr. Martin Helmke's Sabbatical application. As he promotes, this opportunity to create the GMC at the University will yield tangible growth in his professional development fostering collaboration with colleagues: a) within academia, b) the professional world, c) departmental majors, and d) the community on a meaningful and timely topic. In turn, he will apply the knowledge acquired from the Sabbatical to his Hydrogeology courses (ESS 439/539 and ESS 549), which will increase the reputation and rigor of the Department's newly-approved M.S. Geoscience program.

An earnest and significant project such as this embodies the Department's goals, including our student learning outcomes, by giving students practical experience in real-world geological issues, enhancing their data analysis and scientific communication to the academic and professional community at national conferences. The anticipated increase in visibility and quality the GMC will give to the Department will also attract a greater number and/or quality of students, complementing the 200%+ growth we have seen over the last 10 years.

b. ______ Joel Hill ______
   Dean
   3/11/16
   Date

Please comment below on how this sabbatical relates to the school/college goals or long range plans.

This sabbatical project is an exciting one that is well-aligned with the teacher-scholar citizen model advocated by the Department of Geology and Astronomy. In addition, the project provides valuable experiences for students and advances university goals related to sustainability. Professor Helmke is a talented and productive member of our faculty.

14. ______ Matthew Helmke ______
   Signature of Faculty Applicant
   3/10/16
   Date
15. Signature of SaLe Committee Chairperson (may include committee comments):

Signature of SaLe Chairperson ______________________  Date ______________________

16. Status of Applicant:

☐ Recommended  ☐ Not Recommended

Signature of President or Designee ______________________  Date ______________________

17. The above detail is important to allow the SaLe Committee to determine academic purpose and to permit the President to implement his/her rights under CBA Article XIX, A., 11, d.

(All materials submitted herewith shall become part of the applicant's official personnel file under CBA Article XIII.)

N.B. The application MUST be submitted in hardcopy. Please follow the procedures for submission as outlined in the "Overview" tab on the Provost's webpage.
CV
MARTIN FREDERICK HELMKE, PhD, PG
CURRICULUM VITAE
March 2016

Department Chair and Full Professor of Geoscience
Department of Geology and Astronomy, West Chester University of Pennsylvania
211 Merion Science Center, West Chester, PA 19383
e-mail: mhelmke@wcupa.edu, Work Ph: (610) 436-3565, Home Ph: (703) 785-1145, Fax: (610) 436-3060

1. EDUCATION
1.a. Degrees Conferred
2003  Ph.D., Geology and Water Resources, Research Honors, Iowa State University, Ames, Iowa
1994  B.S., Environmental Science (Geology), Antioch College, Yellow Springs, Ohio

1.b. Licenses and Certifications
2013  P.G., Pennsylvania Professional Geologist License #5117

2. EXPERIENCE
2.a. Teaching Experience
2014 to Present  Department Chair and Full Professor of Geoscience, West Chester University Department of Geology and Astronomy, West Chester, Pennsylvania.

- Courses: Advanced Hydrogeology (ESS 549), Hydrogeology (ESS 439/539), Introduction to Soils (ESS 490/590), Applied Field Soil Classification (ESS 480/580), Geology of NW National Parks (ESS 394/594), Professional Geologist Preparation Course (ESS 480/580), and Introduction to Geology (ESS 101).

2010 to 2015  Associate Professor of Geoscience, West Chester University Department of Geology and Astronomy, West Chester, Pennsylvania.

- Courses: Hydrogeology (ESS 439/539), Introduction to Soils (ESS 490/590), Geology of NW National Parks (ESS 394/594), Geology of Southwest National Parks (ESS 392/592), and Introduction to Geology (ESS 101).

- Other primary duties: Graduate Coordinator, MA Geoscience Program; Associate Radiation Safety Officer, Faculty Associate for Service-Learning

2005 to 2010  Assistant Professor of Geoscience, West Chester University Department of Geology and Astronomy, West Chester, Pennsylvania.

Taught Hydrogeology (ESS 439/539), Introduction to Soils (ESS 490), Geology of National Parks (ESS 394/594), and Introduction to Geology (ESS 101).

Sum. ’07 & ’08  Director, Iowa State University/University of Nebraska Field Camp, Shell, Wyoming.

Directed the 6-week field camp, responsible for teaching field geology exercises, managing personnel, coordinating instructors and industrial personnel, and ensuring safety of students.

2006  Instructor, Iowa State University/University of Nebraska Field Camp, Shell, Wyoming.

Developed and taught soils and hydrogeology field modules and assisted teaching regional, structural, and sedimentary geology in the Bighorn Basin of Wyoming.

2004 to 2005  Visiting Assistant Professor of Geology, Dickinson College Department of Geology, Carlisle, Pennsylvania.

Taught Contaminant Hydrogeology with lab (GEOL 311), Physical Geology with lab (GEOL 131), and Earth Systems Science with lab (GEOL 131). Advised 4 students conducting senior research and/or internships.

2000 to 2001  Instructor of Geology and Environmental Science, Iowa State University Department of Geological and Atmospheric Sciences, Ames, Iowa.

Taught Hydrogeology with lab (GEOL/ENSCI 411/511) and Contaminant Hydrogeology (GEOL/ENSCI 434/534).

1994 to 2000  Geology Teaching Assistant, Iowa State University Department of Geological and Atmospheric Sciences, Ames, Iowa.

Taught laboratory sections of Hydrogeology (twice), Hydrogeology Field Methods (twice), Geology for Engineers (five times), Geomorphology, Glacial Geology, and Physical Geology.
1992  Geology Teaching Assistant, Antioch College Environmental and Biological Sciences Department, Yellow Springs, Ohio.
Taught a laboratory section of Introductory Geology.

2.b. Professional Experience

2011 to Present  Hazardous Materials Technician, Chester County Department of Emergency Services, West Chester, PA

Summer 07/08  Director, Iowa State University/University of Nebraska Field Camp, Shell, Wyoming.
Directed the 6-week field camp, responsible for teaching field geology exercises, managing personnel, coordinating instructors and industrial personnel, and ensuring safety of students.

2006  Instructor, Iowa State University/University of Nebraska Field Camp, Shell, Wyoming.
Developed and taught soils and hydrogeology field modules and assisted teaching regional, structural, and sedimentary geology in the Bighorn Basin of Wyoming.

2004 to 2005  Visiting Assistant Professor of Geology, Dickinson College Department of Geology, Carlisle, Pennsylvania.
Taught Contaminant Hydrogeology with lab (GEOL 311), Physical Geology with lab (GEOL 131), and Earth Systems Science with lab (GEOL 131). Advised 4 students conducting senior research and/or internships.

2001 to 2004  Senior Hydrogeologist and Environmental Scientist, Versar Inc., Springfield, VA
- Senior Scientist and Statistician improved EPA’s Probabilistic Dilution Model (PDM) for the EPA Office of Pollutant Prevention and Toxics.
- Served as Project Statistician responsible for calculating probabilistic risk assessment for children exposed to arsenic and chromium through CCA-treated wood products for the EPA, Office of Pesticide Programs, Antimicrobial Division.
- Sr. Hydrogeologist and Field Project Manager for Remedial Investigations (RIs) under the CERCLA program at Ft. Meade, MD.
- Project Manager responsible for designing and implementing geophysical investigations at 10 suspected dump sites and one cemetery at Ft. Meade, MD.
- Member of Versar’s Anthrax Response Team responsible for opening letters suspected to be contaminated by Anthrax or other bacteriological agents.
- Sr. Hydrogeologist responsible for assessing and remediating solvents at a former dry-cleaning property in Rockville, MD.
- Project Hydrogeologist responsible for conducting soil, groundwater, and soil gas investigations at rail stations and bus garages throughout the Washington, D.C. area for the Washington Metropolitan Area Transit Authority.

Summer 2001  Driller’s Assistant (“Rough Neck”), Aquadrill, Iowa City, Iowa

2000 to 2001  Instructor of Geology and Environmental Science, Iowa State University Department of Geology and Atmospheric Sciences, Ames, Iowa.
Taught Hydrogeology with lab (GEOL/ENSCI 411/511) and Contaminant Hydrogeology (GEOL/ENSCI 434/534).

1994 to 2000  Geology Teaching Assistant, Iowa State University Department of Geology and Atmospheric Sciences, Ames, Iowa.
Taught laboratory sections of Hydrogeology (twice), Hydrogeology Field Methods (twice), Geology for Engineers (five times), Geomorphology, Glacial Geology, and Physical Geology.

1993 to 1994  Hydrogeologist and Borehole Geophysics Technician, Hydro-Legs, Yellow Springs, Ohio
Project: Hydrogeologist for evaluation of a landfill Permit to Install (PTI) application submitted to the State of Ohio. Reviewed and critiqued hydrogeologic and isotope geochemistry data. Evaluated the potential for fractures in glacial till to transmit leachate to an underlying aquifer.


1991  Hydrologist and Field Technician, Northern Arizona University, Flagstaff, Arizona

1990  Cavern Naturalist, Boyden Cave, Sequoia National Forest, Kings Canyon, California

1985 to 1988  Geologist Intern (volunteer), United States Geological Survey, Reston, Virginia

2.c. Alternate Workload Assignments

2014-Present  Department Chair

2011-2014  Graduate Coordinator, MA Geoscience Program

2013-Present  Associate Radiation Safety Officer

2012/2013  Faculty Associate for Service-Learning

Spring 2008  Attended the Curriculum Integration Seminar, a university-wide seminar for faculty to discuss inequality issues in the classroom. 3-contact-hour AWA.

2.d. Professional Development

Dec 2015  Transport Modeling with MT3DMS, MODFLOW-USG, and SEAWAT in Groundwater Vistas (40 hrs).

Martin F. Helmke, Curriculum Vitae | 2
3. CONTINUING SCHOLARLY WORK

3.1. Publications

3.1.1. Scholarly Works Published in Peer-Reviewed Scientific Journals and Books


U.S. Environmental Protection Agency. Source code of PDM module developed by Helmke, M. F. for Versar Inc. 2007. Exposure and Fate Assessment Screening Tool (E-FAST).


Environmental Protection Agency, Office of Pesticide Programs, Antimicrobials Division and Versar, Inc. 225 p.

3.0.2. Recent Peer-Reviewed, Published Abstracts

3.0.3. Peer-Reviewed Technical Reports and Articles since Promotion to Associate Professor
Helmke, M. F. and ESS 499/539 Students, West Chester University. 2014. Hydrogeologic analysis of the Davis Oil Petroleum Site, West Chester, PA. Submitted to the Pennsylvania Department of Environmental Protection. 20 p.
3. b. Sources of Funding

3. b.1. External Funding

<table>
<thead>
<tr>
<th>Date</th>
<th>Amount</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>May '13</td>
<td>$1,993</td>
<td>Helmke, M. Co-PI; J. Scheldbauer PI. USDA Forest Service Northern Research Station Grant “Hydraulic Properties of Soils in the Gordon Natural Area” Awarded</td>
</tr>
<tr>
<td>May '13</td>
<td>$2,870</td>
<td>Travel and tuition to attend Disaster Technical Search Specialist course at Texas A&amp;M, funds provided from West Chester Fireman’s Relief Association Awarded</td>
</tr>
<tr>
<td>Nov '09</td>
<td>$699,925</td>
<td>“Professional Science Master’s Degree at West Chester University of Pennsylvania” Co-PI with Marc Gagné, submitted to NSF (PI), Anthony Necastro (Co-PI), letter of intent submitted 10/6/09 Unfunded</td>
</tr>
<tr>
<td>Aug '09</td>
<td>$249,608</td>
<td>Pennsylvania Conservation Works! Grant for installation of a geothermal system at Fame Fire Company. NOTE: The total grant worth $249,608; West Chester Geoscience Institute would receive $15,000. Unfunded</td>
</tr>
<tr>
<td>Aug '09</td>
<td>$5,000,000</td>
<td>US Department of Energy Geothermal Energy Grant for expansion of WCU’s geothermal wellfield, supported Tom Clark (PI) by writing research component of grant. Awarded</td>
</tr>
<tr>
<td>May '09</td>
<td>$1,500,000</td>
<td>Pennsylvania Economic Development Association grant for expansion of WCU’s geothermal wellfield, supported Tom Clark by writing the research component. 2 Awarded $400,000; the university turned down the award. (Awarded)²</td>
</tr>
<tr>
<td>Apr '09</td>
<td>$404,381</td>
<td>National Science Foundation Major Research Instrumentation Grant for Bruker D8 Advance XRD. PI: Kurt Kolasiński, Co-PIs: Martin Helmke, LeeAnn Srogi, Matthew Waite, and Heather Wholey Unfunded</td>
</tr>
<tr>
<td>Mar '09</td>
<td>$11,000</td>
<td>Pennsylvania Space Grant Consortium. PI: Karen Vanlandingham, Co-PIs: Martin Helmke, Timothy Lutz, and Carolyn Sealfon. Awarded</td>
</tr>
<tr>
<td>May '08</td>
<td>$3,800</td>
<td>Iowa State University Geology Field Camp funded travel and support for WCU student Tiffany Neumann to research the Madison Aquifer in Shell, WY Awarded</td>
</tr>
<tr>
<td>Jan '08</td>
<td>$1,448</td>
<td>West Chester Geoscience Institute (WCGI) contract with Dr. LeeAnn Srogi to hire student Jacqueline Dine for “Origins of layering in 200-million-year-old igneous rocks in Southeastern PA” project. Awarded</td>
</tr>
<tr>
<td>Dec '07</td>
<td>$5,000</td>
<td>Pennsylvania Department of Community and Economic Development Grant, “WCU volunteer firefighter service-learning initiative” Awarded</td>
</tr>
<tr>
<td>May '07</td>
<td>$5,700</td>
<td>Iowa State University Geology Field Camp funded travel and support for students Awarded</td>
</tr>
<tr>
<td>Mar '07</td>
<td>$10,000</td>
<td>American Geophysical Union Hydrology Section Horton Grant, Awarded</td>
</tr>
<tr>
<td>Mar '07</td>
<td>$1,903</td>
<td>Geological Society of America Grant, Awarded</td>
</tr>
<tr>
<td>Mar '06</td>
<td>$2,500</td>
<td>Geological Society of America Grant, Awarded</td>
</tr>
<tr>
<td>Mar '06</td>
<td>$500</td>
<td>Sigma Xi Grant, Awarded</td>
</tr>
<tr>
<td>Mar '06</td>
<td>$1,000</td>
<td>Association of Ground Water Scientists and Engineers Grant, Awarded</td>
</tr>
<tr>
<td>Mar '05</td>
<td>$1,000</td>
<td>American Mineralogical Society Grant, Awarded</td>
</tr>
</tbody>
</table>

4. c. 2. Internal Funding

<table>
<thead>
<tr>
<th>Date</th>
<th>Amount</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar '13</td>
<td>$500</td>
<td>Diggory, M. (student) and M. Helmke (faculty sponsor). CAS Student Research Grant &quot;Stormwater Infiltration Basins as a Sinkhole Triggering Mechanism&quot; Awarded</td>
</tr>
</tbody>
</table>

Martin F. Helmke, Curriculum Vitae | 5
Feb '13  $4,000  Awarded
Helmke, M. PI. CAS 3-credit graduate assistantship “Graduate Assistantship for the WCU Geothermal Research Initiative”

Nov '12  $14,765  Awarded
Helmke, M. PI; Co-PIs C. Hall, S. Good, and L. Srog. WCU Provost’s Initiative Grant “Strategic Improvements to the M.A. Geoscience program to Meet Market Demands and Student Needs”

Oct '12  $6,189  Awarded
Helmke, M. PI. WCU FGD Grant “Computer Simulation of Heat to Evaluate Performance and Sustainability of the WCU Geothermal System”

Nov '11  $6,936  Awarded
Helmke, M. PI. CAS New Initiatives Grant “Develop a 300/500-level Online Hybrid Engineering Geology Course for the Department of Geology and Astronomy”

May '09  $25,891  Awarded
WCU Technology Fee Proposal for 20 PC laptops for Department of Geology and Astronomy

Feb '09  $1,974  Awarded
WCU CASSDA grant to investigate “Groundwater Effect on the Efficiency of Geothermal Heat Pump Systems”

Dec '08  $5,140  Awarded
WCU President’s Initiatives Fund, “Poetry Center Rain Garden” submitted by Gail Fellows, Martin Helmke, Joan Welch, Mike Peich, Patrick Gardner*, and Tara Speck*.

Mar '08  $500  Awarded
WCU CAS Student Research Grant submitted by Tiffany Neumann,

Jan '08  $31,418  Awarded
WCU Technology Fee Equipment Request for Hand-held XRF submitted with Dr. LeeAnn Srog

Mar '06  $300  Awarded
WCU CAS Student Research Grant submitted by Michael Coughlin

Oct '05  $3,489  Awarded
WCU CAS Entrepreneur Grant to develop West Chester Geoscience Institute

Oct '05  $1,253  Awarded
WCU CASSDA Grant to study particulate transport of lead through soil

4. SERVICE
4a. Professional Service – National/International
October 2008  Session chair “Wastewater Recycling and Disposal in Diverse Environments: Challenges and Creative Solutions”, National GSA and SSSA, Houston, TX.


4a.1. Professional Service – Regional/State
March 2014  Session Chair, “Groundwater Contamination and Remediation: Challenges and Innovative Solutions”, Northeast Geological Society of America meeting, Lancaster, PA

2014-pres.  Communications Committee, Pennsylvania Council of Professional Geologists

2014-pres.  Elected to the Executive Board of the Pennsylvania Council of Professional Geologists

2011-pres.  Hazardous Materials Technician, Chester County HazMat Response Team

2011-pres.  Trench Rescue Manager, Chester County Rescue Task Force

2008-2010  Trench Rescue Squad Leader, Chester County Rescue Task Force

2008-pres.  Rescue Specialist, Pennsylvania Company 2 Urban Search and Rescue Team

March 2006  Presided over the topical session “Applied Hydrogeology and Environmental Geology for the 21st Century” at the Northeast Geological Society of America Meeting in Camp Hill, PA.

March 2006  Invited to join the Northeast Geological Society of America Advisory Committee to promote participation of professional geologists at NEGSA conferences.

July 2000  Participated in two 1-week caving camps for 10-13 year-olds at the Science Center in Des Moines, Iowa and led two caving trips to Maquoketa Caves.

July 2000  Presented three 3-hour presentations regarding wellhead protection for the Iowa Rural Water Association with Trenton Twedt in Tipton, Newton, and The Amana Colonies, Iowa.
4.a.3. Professional Service – Local
2008-pres. Member, Community Action Committee, Sartomer Chemical Facility, West Chester, PA
2006-pres. Member, Fame Fire Co. #3
Spring 2009 Advised Science Olympiad/Environmental Chemistry students from Bayard Rustin High School, who received 1st place in the 2009 regional competition.
November 2007 Developed a map and orienteering exercise for a girl scout troop with Dr. Joby Hilliker.

5.b. State-Level Service
10-12/13-pres. APSCUF state delegate
2004/2005 Elected Vice President of the Franklin County Grotto Cave Club, dedicated toward cave conservation in South-Central Pennsylvania

5.c. University-Level Service
2014-pres. WCU Course Scheduling Committee
Apr 2014 Chair and Graduate Dean Representative, WCU Graduate Academic Integrity Board
2013-2014 Member, WCU Graduate Thesis Ad-Hoc Committee
2013-2014 Elected Member, WCU Graduate Executive Committee
2013-pres. Member, WCU Disaster Response Committee
2013-pres. Member, WCU Hazard Mitigation Committee
2013 Member, Search Committee for WCU Environmental Health and Safety Officer
2012 Member, Search Committee for WCU Director of Service-Learning and Volunteer Programs
2012 Member, Search Committee for WCU Director of Graduate Admissions
2008-pres. Member, Service-Learning Work Group
2006-pres. Appointed APSCUF representative, WCU Safety Committee
2006-pres. Member, WCU Emergency Services QRS 58
2005-2013 Geology and Astronomy Delegate to WCU APSCUF
2007-2009 Member, APSCUF Bylaws Committee
2005-pres. LGBTQ Ally
2004-2005 Member, PDE re-accreditation committee at Dickinson College for Earth and Space Science Education program.

5.d. College of Arts and Sciences Service
2006-2014 Member, College of Arts and Sciences Student Recognition Committee
2009-2011 Member, Geology and Astronomy/Physics Astronomy Program Committee

4.e. Department Service
2011-2014 Chair, MA Geoscience Graduate Committee
2010 Chair, Structural Geologist Search Committee
2008-2011 Chair, Department of Geology and Astronomy Curriculum Committee
2008-2011 Member, Department of Geology and Astronomy Scholarship Committee
2008-2011 Member, Department of Geology and Astronomy Assessment Committee
2007-Apr '08 Member, Department of Geology and Astronomy Search Committee for the Geoscientific Education/Geochemistry Position
2007-May '08 Member, Department of Geology and Astronomy Curriculum Committee
2006-May '08 Co-Chair, Department of Geology and Astronomy Assessment Committee
2006 Member, Department of Geology and Astronomy Search Committee for the Geomorphology Position.
2005-2008 Chair, Department of Geology and Astronomy Student Scholarship Committee

5. SELECTED HONORS/ACHIEVEMENTS
WCU Honors College Outstanding Faculty Recipient, 2013
On the Cutting Edge Exemplary Teaching Activity award for “Dye Trace Experiment using “Aerial” Imagery”, 2013
Service Learning Leadership Award, Pennsylvania House of Representatives, Presented by Representative Duane Milne, April 24, 2009

Martin F. Helmke, Curriculum Vitae | 7
National Council Award, Sigma Gamma Epsilon, Student Tiffany Neumann received this award for her outstanding research presented at the Geological Society of America Meeting in Houston, TX, 2008
Guardian of Soils Award, Presented by ESS 490/590 students Fall, 2008
Firefighter of the Year, Fame Fire Company #3, West Chester, PA, 2007
Apprentice Firefighter of the Year Award, Fame Fire Company #3, West Chester, PA, 2006
Outstanding Research Award, Graduate College, Iowa State University, 2003
Outstanding Graduate Student Research Award, Iowa State Water Resources Research Institute, 2001
John Lemish Award for Outstanding Research, Department of Geological and Atmospheric Sciences, Iowa State University, 1998 and 2000
Outstanding Teaching Assistant Award, Department of Geological and Atmospheric Sciences, Iowa State University, 1996 and 1999
Horton Award, Hydrology Section, American Geophysical Union, 1997
Outstanding Hydrogeology Research Proposal Award, Geological Society of America, 1996
Outstanding Geology Research Proposal Award, Geological Society of America, 1996 and 1997
Graduate Student Seminar Best Paper Award, Department of Geological and Atmospheric Sciences, Iowa State University, 1998 and 2000
Graduate Student Seminar Best Paper Runner-up Award, Department of Geological and Atmospheric Sciences, Iowa State University, 1995, 1996, 1997, and 1999
Elected Associate Member of the Sigma Xi Scientific Research Society, 1996
Premium for Academic Excellence (PACE) award, Department of Geological and Atmospheric Sciences, Iowa State University, 1994
Best Paper Award Second Place, Fourth Annual Ohio Undergraduate Science Paper Symposium, Central State University, Ohio, 1993
Eagle Scout, Boy Scouts of America, Oakton, VA, 1987

6. PROFESSIONAL SOCIETY MEMBERSHIPS
Association of Environmental and Engineering Geologists, Pennsylvania Council of Professional Geologists, National Association of Geoscience Teachers, Geological Society of America, Sigma Xi, American Geophysical Union, National Ground Water Association, National Speleological Society, Sigma Gamma Epsilon

Note: * denotes student co-author
Budget Justification

The primary requirement for funding for this project will be salary compensation during the sabbatical. Because we already have the software and computers necessary to run this project, we will not require additional equipment or supplies.

We will request funding for two full-time graduate assistantships during the fall 2017 semester, however this project will not be contingent on this funding because students will be enrolled in the ESS 602 Graduate Research and will be able to complete the research as part of the course requirements. I will also encourage two undergraduate students to apply for the CAS undergraduate student research award to assist them with funding for this project.
Letters of Support
Professor Helmke: Save Our Water is greatly in support of your proposal to take a sabbatical from your teaching duties to devote more time to research and collaboration with groups such as ours. As you know, we have incorporated as a non-profit for the specific purpose of advocacy of water rights of citizens in our local area. We have over 2000 local area supporters. Due to a threat to local water supplies from a water utility company, we are engaged in a long term stream monitoring program. Our primary goal is to protect the Broad Run Creek, a tributary of the White Clay Creek, which is federally protected under the "Wild and Scenic Rivers" program.

The Delaware River Basin Commission (DRBC) has allocated a large quantity of water to a Delaware water utility from a well in an aquifer which is located directly under the Broad Run Creek. The water would used to serve customers mostly in Delaware rather than in our local area, where most homes have private wells. The water company is required to monitor the stream and some private wells, but the DRBC has also welcomed independent input from other groups as well. In order to provoke an independent check of the monitoring data generated by the water company, Save Our Water has committed to a long range stream monitoring program. We intend to use the data for some modeling studies as well. Our goal would be to develop the expertise needed to convince the DRBC that pumping of the aquifer should be curtailed if conditions occur (drought or over-pumping) which may cause the stream to reach very low flow rates- which would cause long term damage to the stream ecosystem.

If you could devote time to advise with us on this project, we would share all data. We would welcome a collaboration as no one in our group has had formal training in hydrogeology. We believe that expert advice is needed to improve our chance of ultimate success. We expect that you could provide valuable assistance in the modeling work, as well as helping us to understand this small, but very complex watershed.

As indicated above, there is significant local support for this work, as the citizens are concerned both for their private wells and do not want to see damage to the local stream ecosystem. We look forward to working closely with you.

Thank You Very Much
Marion Waggoner, PhD, Retired DuPont Senior Technology Fellow
Save Our Water President

Dave Yake, PhD, Retired DuPont Technology Director
Save Our Water Director
March 10, 2016

To Whom It May Concern,

I am writing to show my support of Dr. Helmke’s request for sabbatical leave to allow him to dedicate time to develop the WCU Groundwater Modeling Center and apply groundwater flow modeling techniques to support community hydrogeologic studies.

I am a hydrogeologist representing People for Safe Water, a citizen action group based in Clark County, Ohio. We are concerned that solvents emerging from the Tremont City Barrel Fill may have the potential to contaminate wells that distribute drinking water to the residents of Springfield, Ohio.

Previous investigations have developed wellfield protection plans, but they have incorporated a significantly incorrect 3-dimensional geometry of the aquifer system that exists between the landfill and the Springfield wellfield. I have provided Dr. Helmke with all the documents, reports, and geologic maps necessary to construct an accurate groundwater flow model of our system.

Unfortunately we are fighting against US EPA Region 5, the same folks who enabled the State of Michigan bring leaded drinking water to Flint. We need all the help Dr. Helmke can give us.

We look forward to working with Dr. Helmke and his students and will provide any additional information necessary to conduct this important project.

Sincerely,

Peter Townsend MS, PG
Resident Scholar
Professor of Environmental Science and Geology (retired)
Antioch College, Yellow Springs, Ohio 45387
ptownsend@antiochcollege.org
937-215-0578