

George Witmer, PhD

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Education

BS Chemical Engineering Provo, UT

Brigham Young University,

GPA: 3.97/4.0, Summa Cum Laude, highest GPA in College of Engineering; earned 100% of expenses through scholarships and part-time work. Electives in applied mathematics and nuclear engineering. Part-time job running computer simulations of rocket engines.

PhD Chemical Engineering Houston, TX

University of Houston,

GPA: 3.99/4.0, Exxon Fellow. Computational studies of multiple steady states in catalytic systems. Three publications. Completed in three and a half years.

Master of Business Administration PA

Lehigh University, Bethlehem,

GPA: 3.99/4.0 Core business management classes, including information technology, and electives in negotiation, innovation, and Six Sigma. Completed in less than three years while working full time.

Skills

- **Programming (Java, Python, others)**
- **Teaching and Instruction**
- **Capstone Program Management**
- **Agile Programming with Scrum**
- **Computational Problem Solving**
- **Software Development Lifecycle**

Work History

Adjunct Professor of Computer Science, Lehigh University, Bethlehem, PA

Teach senior-level capstone course to students majoring in Computer Science and Business. Implemented Agile with Scrum, redesigned course schedule to focus on project work. Significantly improved project quality and completion rate. Also manage the CSB capstone program, find/coordinate external sponsors for capstone projects; obtained record funding in first year.



Enterprise Architect, Lutron, Coopersburg, PA

Consulting assignment to develop software application retirement process; Identified/classified over 500 applications, developed and implemented process to retire approximately one application per day, with end target < 100 applications.

Enterprise Architect, PPL, Allentown, PA

Led governance processes for new technology and project architecture. Led business continuity planning efforts. Led cost reduction effort, identified more than \$10 million in potential cost reductions.

Innovation Manager, Air Products, Allentown, PA

Led innovation for Global IT organization. Ten active research programs, over 60 projects. Developed and taught Project Leadership for Innovation course to over 100 IT professionals in the US and Asia.

R&D IT / Lean Six Sigma Manager, Air Products, Allentown, PA

Led software systems team that created more than 70 applications with over \$15 million savings. Developed customized training class for R&D personnel on the basics of Lean Six Sigma with particular application to research environments. Taught the class to over 300 R&D researchers. Rated over 4.7/5.0.

Research and Engineering Systems, Air Products, Allentown, PA


Implemented Air Products' first high-performance computing environment and Internet services. Led Computational Fluid Dynamics team. Developed computational modeling software for engineering and research groups. Developed courses on the basics of UNIX (taught over 200 researchers), and the basics of Internet usage (taught over 500 employees). Consistent high ratings. UNIX course materials later reused at Moravian College.

Research and Development, Air Products, Allentown, PA

Theoretical and experimental studies on cryogenic distillation using structured packing. Developed computational models, communicated results via research reports. Two patents and a trade secret.

Other Accomplishments

- Hired and mentored more than 25 entry-level employees over 20 years, many of whom have since moved into senior level positions.
- Coordinated/developed five annual student projects in partnership with Lehigh University in knowledge management, mobile application development, and Internet of Things.
- Taught numerous courses as part of Air Products University, including Internet usage, UNIX fundamentals, data visualization, high performance computing, Lean Six Sigma, Lean Performer and project leadership for innovators. Rated highly by students.
- Led evaluation/prototype for community-based approach to developing software via crowdsourcing. Highly scalable, excellent quality. Calculated potential annual savings up to \$15 million.

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- Initiated innovative research efforts in Internet of Things, including Mobile devices, Kinect, BYOD, Drones, Telepresence Robots, Robotics systems.
 - Created novel application that allowed non-developers to create/manage standard web sites. Built working prototypes, scaled to 1500 users in 25 departments. Saved \$0.5 million each year in reduced labor costs.
 - As an undergraduate at BYU, taught freshman-level Navajo language course for two semesters.

External

- Tau Beta Pi, Phi Kappa Phi.
- Dale Carnegie; Kellogg Institute Executive Management
- Chair, Industrial Research Institute Information Services Director's Network
 - ICEX Digital Innovation; Advisory Board, Microsoft Innovation Outreach Program
 - Boy Scouts of America, Assistant Scout Master, 1995-2004.
 - Self-Reliance / Development Counseling specialist (volunteer position)

Publications

1. Vemuri, Balakotaiah, George Witmer, Raymond Hu and Dan Luss. (1987). Dependence of the Multiplicity Features of an Isothermal Catalytic Reaction on External and Internal Transport Resistances. *Chemical Engineering Communications*, 58, pp. 195-211.
2. George Witmer, Vemuri Balakotaiah, and Dan Luss. (1986). Multiplicity Features of Distributed Systems - I. Langmuir-Hinshelwood Reaction in a Porous Catalyst. *Chemical Engineering Science*, 01/1986.
3. George Witmer, Vemuri Balakotaiah, and Dan Luss. (1986). Finding Singular Points of Two-Point Boundary Value Problems. *Journal of Computational Physics*, 01/1986; 65(1): 244-250.

Patents

1. Douglas L. Bennett, Keith A. Ludwig, George S. Witmer and Charles M. Woods. 1987. Separating Argon/Oxygen Mixtures Using a Structured Packing. United States Patent and Trademark Office Patent No. 4,836,836, filed December 14, 1987.
2. Douglas L. Bennett, Keith A. Ludwig, George S. Witmer and Charles M. Woods. 1989. Separating Argon/Oxygen Mixtures Using a Structured Packing. United States Patent and Trademark Office. Patent No. Re. 34,038. Application for reissue May 31, 1991, Ser. No. 708,948.



Clearances

- 1. Pennsylvania Criminal Record Check **2015**
- 2. Pennsylvania Child Abuse Clearance **2015**

Teaching Statement

George S. Witmer

In my teaching, I seek to apply the following four principles:

(1) Long-term retention

I seek to apply the latest scientific research, which indicates that long-term retention is best provided by frequent, spaced retrieval, interleaving, and feedback. I anticipate using a variety of methods for this, including short, low or no-stakes quizzes and programming exercises at the beginning of each class covering the previous class material, “brain dumps” during class where students write down everything they can remember from the lecture – or the previous lecture – and pair programming exercises where students provide feedback to one another. Since many computer science topics build naturally on one another, students will have opportunities to review earlier topics as they cover more advanced ones. Moreover, computer science is particularly well-suited to use of automated tools that provide retrieval, interleaving, and feedback, and I will seek to make effective use of these tools. I want my students to remember how to program in Java when they need to do so for their capstone project.

(2) Understanding effective application of content

I have had many years of work experience as a developer, development manager, and architect, as well as sponsoring and advising a large number of capstone projects. I will provide numerous examples to the students of how topics relate to “real-world” situations. I will also provide specific examples of things they should do (such as test, test, test) and counterexamples of things that should be avoided (doing development work on a client with no back-up). These examples provide both education and motivation.

(3) Understanding connections with the broader curriculum

My experience allows me to place topics in context so students understand how things they cover now will be useful later in the curriculum when they study algorithms, operating systems, and of course the capstone. I was active in the industry when Java was invented, so I can explain some of the reasons for some of the language features and how they relate to the internet, web, and cybersecurity. I was a Unix systems administrator, so I can explain the advantages of scripting languages as well as some of their limitations. Because of the numerous connections I have with companies in the area, I can also provide occasional guest speakers who can provide additional context and application examples.

(4) An excitement about the profession and an interest in my students

I take an active interest in my students, and I share examples frequently about my own experience in the profession. My enthusiasm is contagious, and I enjoy general discussions about where the industry is going, where careers are going, and what might be the best preparation. During a lecture, for example, I may point out that Java is widely used across many industries, while C#, which is very similar, is more popular in many non-tech firms because of integration with the Microsoft environment, whereas Swift, Apple’s new programming language for the Mac and iOS, is almost non-existent in corporate America. My volunteer position as a development counselor, where I assist individuals in gaining skills needed to advance their careers, is evidence both of my enthusiasm for helping others as well as the training and experience I have in that area.

Course Qualifications/Interests (* indicates a course of personal interest):

As a Professor of Practice, I would be prepared to teach the following courses immediately:

CSB Capstone 312/313*: I have extensive experience with the CSB capstone program. Before coming to Lehigh, I sponsored numerous capstone projects and worked closely with the students in their work. I joined the Lehigh CSE faculty as an adjunct in January 2017. Since then I have partnered with Professor Sharon Kalafut to extensively revise the 312/313 sequence. I introduced Agile development with Scrum as the software development methodology, with two-week sprints as the basis. We now require weekly reports from the students. These two changes have significantly improved project quality and completion. We also consolidated the lectures to 3-4 at the beginning of the spring semester, allowing more time for student teams to do project work. I also created a lecture on Teams to fulfil a business college learning objective and maintain accreditation. I have introduced a number of other minor but useful innovations to the program, including algorithmic team selection and use of a shared calendar for scheduling team presentations. A year ago, I was appointed capstone program manager, and with my extensive industry contacts and years of experience in program development I solicited a solid collection of diverse projects with a record level of funding. I very much enjoy representing the department and university in this role and continue to look for ways to increase the exposure and quality of the program.

CSE Capstone 280/281*: I am very excited to apply my 313/313 capstone experience to the CSE capstone program. While the two programs are not identical, they share many common features. There is a compelling advantage in having at least one of the instructors be the same for the two programs, since innovations and improvements can quickly pass between the two programs. I will see that this happens.

CSE 001, 002, 140 - I have had years of experience as a developer and am familiar with Java and general programming concepts. I would enjoy teaching students at the introductory level.

CSE 160* - My applied mathematics background includes Probability and Statistics, I can program in Python, and have taken multiple on-line courses in Data Science. Moreover, we have been doing an increasing number of Data Science projects in the CSB Capstone.

CSE 216* - My experience with the CSB capstone, along with many years of experience in industry, have given me a high level of experience with the concepts covered in this course.

CSE 252* - I'm familiar with this course, dating from when Roger Nagel taught it to more recently when Ron Crane was teaching it. I'm very familiar with the ethical and cultural issues surrounding the internet, and more broadly, technology, in our society.

CSE 265, 271 - I worked for several years as a UNIX systems administrator, and have previously taught UNIX fundamentals to hundreds of engineers and scientists in industry.

Additionally, with a minimum of preparation, I would be able to teach the following:

CSE 017 - I am very nearly able to teach this immediately. I would just need to review a few of the advanced topics typically covered at the end of the course. I could be ready to teach this course in January.

CSE 109, 340 - I have a general familiarity with the topics covered in these courses, and with time for review, would be comfortable teaching them.

Continuing Education

In the past five years, I have completed the following on-line technical courses from Coursera, edX and Udacity:

- The Internet and You
- Managing Big Data with MySQL
- Data Visualization and Communication with Tableau
- Python Data Structures
- Getting Started with Python
- Mastering Data Analysis in Excel
- Business Metrics for Data-Driven Companies
- An Introduction to Operations Management
- Computing for Data Analysis (R language intro)
- Differential Equations for Engineers
- Machine Learning Fundamentals
- Probability and Statistics in Data Science Using Python
- Python for Data Science
- Using Python for Research
- Introduction to Linux
- Intro to Relational Databases
- Programming Foundations with Python

I've also explored iOS programming, JavaScript/CSS/HTML and other programming topics independently. I'm able to quickly learn new concepts and enjoying learning new technical material.

Diversity Statement

George S. Witmer

Growing up, I had a number of challenges to overcome. I grew up in a very poor family. My older brother was the first person in our family to graduate from high school. I graduated from an inner-city high school where 1/3 of my class dropped out before graduation. I was the first (and only) in my family to attend college, and I had to fund 100% of my education, because my parents could only afford to provide moral support.

Prior to starting college, I had the life-changing experience of serving as a volunteer for two years on the Navajo Indian reservation in Arizona. Whereas I had previously felt sometimes that life had been unfair to me, living in another culture and realizing the many challenges faced by this people helped me realize that despite my challenges, I was, in fact, also privileged in many ways.

After completing my volunteer service, I applied to college, where I immediately benefited from some of these privileges – for example, no one raised an eyebrow because of my appearance or background when I said I wanted to major in engineering. I worked hard, got good grades and was offered grants and scholarships that covered the cost of my tuition and fees. I was able to get a part-time job on campus which paid for my other expenses. When I decided to go to graduate school, I had multiple offers to choose from, and later, upon graduation, I was able to find a good job and career.

I did not personally experience any discrimination or harassment during my career. Nevertheless, I never forgot my early life and the challenges that I had. I remember thinking how life is unfair in granting some people advantages, and not others. While in theory we are all equals, in practice life doesn't always work that way. I determined that I would do what was in my power to make things as fair as I could.

An early opportunity came when, as a supervisor, I had the opportunity to select an employee for a temporary rotation. I was particularly impressed by an African American candidate and I selected him without hesitation. We differed in a number of ways besides skin color, and I welcomed that diversity. Combining our skills jointly, we designed and wrote a software application that became the primary workhorse for the next decade in one of our key business areas.

After that, I focused on improving the diversity in my department. As a team lead, I hired three women in my team of five – there were only four in the entire department. Later, as a manager, I hired five women in my team of 14. The team was diverse in other ways as well – Caucasians, Indians, and Asians, from various countries around the world, we had chemical engineers, physicists, chemists, a marketing major, computer scientists . . . and we were very successful, developing over 70 applications during the 5-7 years we worked together. It was a great experience, and truly a lesson in the power of diversity.

As a society, we've made some welcome progress over the years. My last manager in industry – and one of my best – was a woman. So was her manager. Yet there is still much to be done. Women and many other groups are still under-represented in IT, and many still encounter active discrimination. As a member of the faculty, I remain committed and look forward to continuing to work for diversity and equity.