

# Michael Nugent

## Curriculum Vitae

4324 Stanton Ave.  
Pittsburgh, PA 15201  
☎ (401) 924-0525  
✉ [mpn1@pitt.edu](mailto:mpn1@pitt.edu)  
🏠 [cs.pitt.edu/~mnugent](http://cs.pitt.edu/~mnugent)

### Education

Expected Graduation: **Doctoral Student in Computer Science**, *The University of Pittsburgh*, Pittsburgh, Thesis: *Energy Efficient Circuit Design*, Adviser: Kirk Pruhs.  
Summer 2015 Research Area: Algorithms (Scheduling and Energy Optimization).

### Undergraduate

Graduated April 2007 **Bachelor of Science, Computer Science and Mathematics**, *The University of Pittsburgh*, Pittsburgh, *GPA – 3.941*.

### General Skills

**Communication** Written sections of numerous papers, as well as developed and presented talks based on both my research and others' work.

**Analytical** Theoretically rigorous modeling of complex problems, as well as exploring, developing, and analyzing possible solutions, within the mathematical framework.

**Collaboration** Worked with colleagues on solving numerous problems, including suggesting and discussing the merits of possible new research directions, as well as writing and presenting solutions.

**Learning** Can quickly discover and assimilate new technical tools, and accurately asses their relevance to current problems.

### Mathematical and Analytical Skills (from research and/or coursework)

**Algorithms** Online Algorithms, Randomized Algorithms, Approximation Algorithms, Optimal Algorithms

**Optimization** Linear Programming, Convex Programming, Combinatorial Optimization, Semidefinite Programming

**Other** Queueing Theory, Probability, Combinatorics, Game Theory, Graph Theory, Circuits

### Computer Skills

**Programming** *Extensive Experience:* JAVA, C,  $\text{\LaTeX}$ , Mathematica, SQL, HTML, javascript, JSP.

**Languages** *Moderate Experience:* C++, CPLEX, CSS, Ruby, Perl, Runtime Revolution.

**Software** Microsoft Office, Eclipse, VIM, SVN

**OSes** Microsoft Windows, Linux/UNIX, Mac OS

### Awards and Societies

Member of the Association for Computing Machinery (ACM), the Society for Industrial and Applied Mathematics (SIAM), and the Institute for Operations Research and the Management Sciences (INFORMS)

2014 Computer Science Department Research Competition Winner in Algorithms/Theory

2013 Runner up for the Computer Science Department Taulbee Award, *for achieving the honor of graduate student excellence and promise as a teacher for the academic year 2012-2013*

---

## Work Experience

- 2007–2011 **Research Programmer**, *Pittsburgh Science of Learning Center*, Pittsburgh, PA.
- Developed online homework submission and data retrieval software, as well as lab-based speech assessment and improvement software.
  - Presented software modifications and improvements to researchers.
  - Retrieved custom datasets for researchers.
  - Provided support for researchers, teachers, and students.
  - Wrote documentation to describe the operation of software, as well as maintenance of the database and software.
  - Anonymized student submissions.
- Summer 2006 **Internship (Research Programmer)**, *Pittsburgh Science of Learning Center*, Pittsburgh, PA.
- Developed software to create interactive geometry diagrams.
  - Integrated software into existing math tutor software.
- Summer 2005 **Internship (QA Engineer)**, *American Power Conversion*, Kingston, RI.
- Wrote scripts to automatically test products under development.
  - Manually tested and submitted bug reports on products under development.

---

## Public Presentations

- 2014 Presentation, Theory Lunch Seminar, Carnegie Mellon University
- 2014 Presentation, CS Day Research Competition Award Ceremony, University of Pittsburgh
- 2014 Poster, Taste of Wine and Research Event, University of Pittsburgh
- 2013 Rump Session Presentation, Workshop on Flexible Network Design, Fields Institute, Toronto

---

## Publications

- [1] Neal Barcelo, Michael Nugent, Kirk Pruhs, and Michele Scquizzato. Almost all functions require exponential energy. In *Proceedings of the 40th International Symposium on Mathematical Foundations of Computer Science (MFCS)*, page (to appear), 2015.
- [2] Neal Barcelo, Peter Kling, Michael Nugent, Kirk Pruhs, and Michele Scquizzato. On the complexity of speed scaling. In *Proceedings of the 40th International Symposium on Mathematical Foundations of Computer Science (MFCS)*, page (to appear), 2015.
- [3] Antonios Antoniadis, Neal Barcelo, Michael Nugent, Kirk Pruhs, and Michele Scquizzato. A  $o(n)$ -competitive deterministic algorithm for online matching on a line. In *Proceedings of the 12th Workshop on Approximation and Online Algorithms (WAOA)*, 2014.
- [4] Antonios Antoniadis, Neal Barcelo, Michael Nugent, Kirk Pruhs, and Michele Scquizzato. Complexity-theoretic obstacles to achieving energy savings with Near-Threshold Computing. In *Proceedings of the 5th International Green Computing Conference (IGCC)*, 2014.
- [5] Antonios Antoniadis, Neal Barcelo, Daniel Cole, Kyle Fox, Benjamin Moseley, Michael Nugent, and Kirk Pruhs. Packet forwarding algorithms in a line network. In *Proceedings of the 11th Latin American Theoretical Informatics Symposium (LATIN)*, pages 610–621, 2014.
- [6] Antonios Antoniadis, Neal Barcelo, Mario Consuegra, Peter Kling, Michael Nugent, Kirk Pruhs, and Michele Scquizzato. Efficient computation of optimal energy and fractional weighted flow trade-off

schedules. In *Proceedings of the 31st International Symposium on Theoretical Aspects of Computer Science (STACS)*, pages 63–74, 2014.

- [7] Antonios Antoniadis, Neal Barcelo, Michael Nugent, Kirk Pruhs, and Michele Scquizzato. Energy-efficient circuit design. In *Proceedings of the 5th conference on Innovations in Theoretical Computer Science (ITCS)*, pages 303–312, 2014.
- [8] Neal Barcelo, Daniel Cole, Dimitrios Letsios, Michael Nugent, and Kirk Pruhs. Optimal energy trade-off schedules. *Sustainable Computing: Informatics and Systems*, 3:207–217, 2013.
- [9] Daniel Cole, Dimitrios Letsios, Michael Nugent, and Kirk Pruhs. Optimal energy trade-off schedules. In *Proceedings of the 3rd International Green Computing Conference (IGCC)*, pages 1–10, 2012.
- [10] Neal Barcelo, Miao Zhou, Daniel Cole, Michael Nugent, and Kirk Pruhs. Energy efficient caching for phase-change memory. In *Proceedings of the 1st Mediterranean Conference on Algorithms (MedAlg)*, pages 67–81, 2012.

---

## Teaching Experience

- Recitation Instructor
  - Lead 13-16 recitations per course, consisting of one of the following:
    - Lessons planned by me to reinforce and supplement class lectures.
    - Pre-planned labs.
    - Sets of problems related to coursework, which I would lead the students in solving.
  - Graded student homeworks and projects.
  - Held office hours to aid students enrolled in the course in understanding course material and applying it to coursework.
  - Average student evaluations:
    - The recitation instructor was well-prepared for the recitations: 4.3/5
    - The recitation instructor appeared knowledgeable about course subject matter: 4.3/5
    - The recitation instructor provided helpful answers to students' questions: 4.2/5
  - Courses:
    - CS1501: Algorithm Implementation (Fall 2012 and Fall 2011)
    - CS0449: Introduction to Systems Software (Summer 2012)
    - CS1502: Formal Methods in Computer Science (Spring 2011)
  
- Grader and Office Hours
  - Graded student homeworks and projects.
  - Held office hours to aid students enrolled in the course in understanding course material and applying it to coursework.
  - Courses:
    - CS2150: Design and Analysis of Algorithms (Spring 2015 and Spring 2014)
    - CS2110: Theory of Computation (Fall 2013)
    - CS1510: Introduction to the Design and Analysis of Algorithms (Fall 2014 and Fall 2013)
    - CS1511: Introduction to the Theory of Computation (Spring 2013 and Spring 2011)

**Bettis Engineering**  
*Bettis Atomic Power Laboratory*  
Pittsburgh, PA

**Michael Nugent**  
4324 Stanton Ave.  
Pittsburgh, PA 15201  
☎ (401) 924-0525  
✉ [mpn1@pitt.edu](mailto:mpn1@pitt.edu)  
📄 [cs.pitt.edu/~mnugent](http://cs.pitt.edu/~mnugent)

June 19, 2015

Dear Sir or Madam,

I am interested in working as a scientific software developer at Bettis Labs in Pittsburgh. Currently, I am working on my Ph.D. in Computer Science at the University of Pittsburgh, and, having recently defended, will graduate in August of this year. Due to the complex nature of the engineering problems that Bettis Labs is working to solve, efficient and robust software to analyze systems and detect possible failures is clearly integral to the development of a safe, reliable product. As a member of your team at Bettis Labs, the skills I've developed throughout my Ph.D. study would likely be beneficial in making progress on these problems, and thus I am interested in beginning a career there.

After a few years of working as a research programmer, I became a Ph.D. student because I wanted to use more directly the mathematics aspect of my undergraduate double major, and going into the algorithms research area has accomplished this. More precisely, my research has primarily been in scheduling and problems where energy minimization plays a role either as a constraint or an objective. Throughout my study, I've formally modeled and developed algorithms to solve numerous problems by discovering and utilizing often subtle properties of the problem in question. For example, in one paper, my coauthors and I reduced a scheduling problem to a geometric problem where each piece of input could be represented as a line, and thus developed an efficient algorithm. I am excited to apply my algorithmic knowledge to different problem domains, such as developing efficient software utilizing numerical analysis. Learning new tools to solve problems has become second nature. In order to do so, I've taken several classes outside of my department (e.g., convex analysis, large scale optimization), as well as taught myself new areas and techniques, for example the research related to my thesis topic, *Energy-Efficient Circuit Design*, required learning a significant amount about the relationships between circuit design and Boolean functions. I have also learned new programming languages and interfaces to aid in my research, some examples of which are CPLEX to find complicated counterexamples to conjectures, and Mathematica to simulate and view the behavior of a hard-to-analyze network.

Throughout my course of study as a graduate student, I've developed my collaborative, communication, and management skills as well. I've improved my collaborative and teamwork skills, as not only have I worked in groups for several class projects, but much of my research has been collaborative with other graduate students, postdocs, and faculty. I've written sections of numerous papers, and created and given several presentations on my research, which have further developed my communication skills. I've learned about and contributed to the proper management of research projects, including beginning with smaller, more achievable goals, while also setting deadlines for determining when to reevaluate problem models or approaches to solutions. I've also had experience as a teacher and mentor by being a teaching assistant and grader for several semesters, where I presented course material to undergraduates, and aided students outside of class in their understanding of course material (from student evaluations: 4.3/5 at being well prepared and knowledgeable in recitations, and 4.2/5 at providing helpful answers to students' questions).

The combination of my technical and more general skills would allow me to significantly contribute to the difficult, complex problems being worked on at Bettis Labs, and I would welcome the opportunity to further contribute to solutions by augmenting my current skill set; thus, I am very interested in a position at Bettis Labs. Thank you for considering my application, and I look forward to hearing from you about possible opportunities.

Sincerely,

**Michael Nugent**