## Fall 2010 Mentors (ECE)

### Graduate Mentors in the PURE Program:

<table>
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<th>Active?</th>
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<td><img src="image1" alt="Photo" /></td>
<td>Feng Xiong - Nanotechnology and Microelectronics (2010)</td>
<td>I am currently working on integrating novel materials like carbon nanotube and graphene into phase change memory to build energy efficient memory devices. I would like to have someone who is interested in doing electrical characterization and data analysis. Experience with MATLAB and LabVIEW would be advantageous, but not required.</td>
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<td><img src="image2" alt="Photo" /></td>
<td>Geoffrey Herman - Engineering Education (2010)</td>
<td>I am currently working on two research projects and am always looking for new ideas, so bring your gripes about engineering education (not enough women, classes too hard, not enough hands-on learning, not enough support from teachers, etc.) and we can research them! For my main research project, we are investigating what makes introductory level computer engineering/science courses (such as ECE 190, ECE 290, CS 231, CS 125, CS 173, etc.) hard for students to learn and how we can help students learn these courses better. This research will be used to develop tools to help refine how these courses are taught both at the University of Illinois and at other schools. A new project that I am just starting focuses on developing a new style of interactive online lectures. The goal of the project is to design a teaching website that includes features such as embedded video, automatic quiz generation, non-linear playback of videos, adjustable lecture pacing, tablet screen captures, and usage tracking. Knowledge of web-focused programming languages will be very helpful.</td>
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<td><img src="image3" alt="Photo" /></td>
<td>John Stratton - GPU programming and Compilers (2010)</td>
<td>My main research project right now is on performance portability: finding ways to build compiler tools and teach programmers to develop one piece of code that will run, with high performance, on many different kinds of hardware (x86, ATI GPUs, NVIDIA GPUs, and maybe even IBM Cell or FPGAs). The main undergraduate contributions I’d be excited about seeing here are actually science and engineering application developers: signal processing, simulation, and so on. We’ll help teach you GPU programming, and see if you can get code from the area you’re interested in to run a few dozen times faster than it used to. Or maybe start from some code we already have, but haven’t gotten to really work on yet. I’m also interested in having someone who would like to work on &quot;tool usability&quot;: There are lots of things that we can build into a tool to make a programmer’s job easier, but it’s not very helpful if the tool itself is difficult to use. If you’re interested in either real compiler development (anyone want to take a crack at writing a source-code-level function inliner?) or real application development (how do we get code to nicely run on Linux, MacOS AND Windows?), I’d love to have your help.</td>
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My current research is focused on computer engineering, mainly having programmed hardware. I am interested in developing and implementing distributed algorithms using network programming. The combination of
Karthik Manamcheri - Computer Engineering

Hybrid Systems and Computer Programming best describes the modeling software we deal with.

Projects: Compiler design from Simulink models to HIOA (Hybrid Automaton) language

Matthew Alonso - 3D Manufacturing (2010)

I conduct research in projection micro stereolithography. It is a technique used to manufacture whatever you can imagine! The technique works by shining patterned light on a photo curable polymer and creating a large number of these layers until you have a three dimensional part. Avenues I have explored include multiple materials, bio compatible and biodegradeable materials, and polymerization depth studies. In the future, I'd like to use the technique to create active components like an electromagnet or solenoid for example. Typically we create structures. About Me: I started in the ACRC research labs as a freshman and continue doing undergraduate research with the ACRC, NanoCEMMS, and Cornell University until I enter graduate school. I have worked at Honeywell, P&G, Shell, and Lawrence Livermore National Laboratories. I am an active member of the Society of Hispanic Professional Engineers. I have a passion for outreach activities and currently I am involved in the CU 1-1 mentoring program.

Networking and Theory

Taylor Johnson - Controls and Computer Engineering

Our research is focused in two areas: that of control systems, such as regulating temperature in a building with a thermostat and air conditioner, and that of distributed computing, such as the groups of computers that make large websites work, in particular dynamic operations like search and data storage. In particular, we are interested in next generation distributed control systems, such as groups of UAVs performing tasks together, or working towards the practical realization of the automated highway system (AHS). A multitude of other example systems exist, such as robotic swarms. Some other relevant terms where these types of system fall are hybrid systems, embedded systems, and cyber-physical systems.

New mentors can sign up easily by just following the Instructions for Creating a New Mentor Page. If you are a current mentor and would like your profile copied from the previous semester, simply send a blank message to uiucpure [at] gmail dot com with subject "Copy Profile.". Feel free to ask us questions as well.
If you are looking for a Mentor profile from a past semester and do not see it in this listing, check under the PURE Archive.