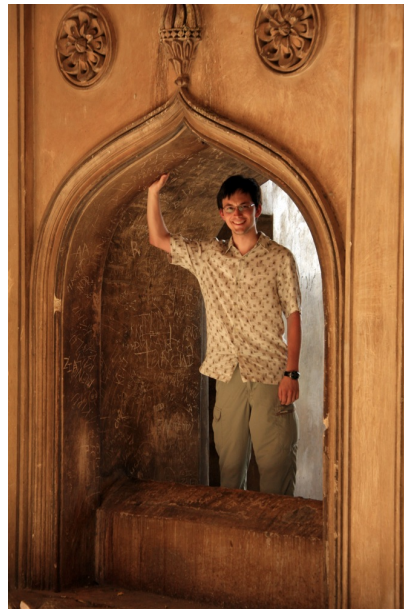


Undergraduate Researcher Profile: Andrew Ash

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So... undergraduate research. You'll hear the phrase bandished about around Tech as if it will save your soul (and get you into grad school while you're at it). Doing research might not help you accomplish the former, but for life after undergrad it will certainly give you the experience to stand out and put all those hours in the classroom to practical use. What follows is the story of how a first-year computer science major became involved with a research project mixing the millenia-long tradition of Indian music with modern computer technology.

My research experience started with a special topics course on Music Technology, MUSI 3450, taken with Parag Chordia. Equal-parts music analysis and music composition and focusing on currently-available technical tools, the class really opened my eyes to the type of work being done in music technology. The query-by-humming of Shazam on your iPhone? Automated playlist generation with iTunes Genius, Last.fm, and Pandora? The electronica pumping out of WREK's 40,000 Watts of EDM Sound System on Saturday nights? Those MP3s filling students' hard drives? All of these are instances



At Charminar in Hyderabad,
India — Spring Break 2009

of music technology making its way to practical use for consumers.

The final project of the class was a choice between creating a composition using tools such as Audacity, Max/MSP, Reason, and Ableton Live, or developing software to analyze music using DSP and Music Information Retrieval (MIR) techniques. Of course, as a CS major I chose to write code! My project used a relatively simple technique, the Harmonic Product Spectrum, to do pitch tracking and detection on a one-line piano melody. Nothing can describe that magic moment where my mess of Matlab code actually plotted the notes I played in the correct pitch and time-location for the first time!

As a result of that project, I was invited back to begin work on an upcoming project in the new GT Center for Music Technology. Advised by Professor Chordia, I was awarded a PURA grant just as our research was picking up full-speed in the Spring 2009 semester. Our group is developing a Content-Based Recommendation system targeted at Indian music, similar in product to Last.fm and Pandora. Where we differ is in approach: rather than the trained music-listener approach taken by Pandora and the social analysis done by Last.fm, our system applies DSP, statistics, and Machine Learning techniques for its recommendations and playlists.

Our group recently presented our work at the Woodruff Arts Center after a concert by Georgia Tech's contemporary music ensemble-in-residence, Sonic Generator. There I was able to discuss my contributions to the project with the general public, which center around web development for our frontend and the algorithms required for generating a playlist from our internal representation of the songs. It was an exciting experience, and one I hope to see occurring again as we make forward progress on the project.

Closer to home was the UROP Spring Symposium put on every year. Instead of a poster, I chose to give a 20-minute oral presentation and field questions about the research. Often, it's only when preparing for a presentation that you reflect on how far your research has come and where you need to go. I'm now much more comfortable giving my elevator pitch about this research after so much time spent pulling together everything our group is doing.

Working on undergraduate research has shifted my academic focus in new directions. I'm now looking into adding the AI thread onto my CS major and squeezing into my schedule a Music or Math minor to reflect my research. I'm also working on getting into a grad-level MIR class with my advising professor to continue developing the skills for research.

Sometimes students struggle finding that initial contact into doing research, and other times it just falls in their laps. I was lucky, but I find that a lot of undergraduate researchers get started just by letting the passion for things they already do shine through. For anyone even remotely considering research, I would recommend simply talking to the professors teaching classes you enjoy about any projects that they're working on. You never know when you might stumble onto something you'll love.

Besides becoming more interested in Music Technology, Andrew plays piano and ping pong, began juggling this summer, and loves photography on his Canon EOS 40D. He also TAs CS 1331, does volunteer bug triage in Amarok on Ubuntu Linux, and is pursuing a career in information security. He recently attended Defcon 17 without appearing on the Wall of Sheep.

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