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Jadrian Miles, PhD

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With a deep background in computer science, mathematical modeling, and humane communication, I make immediate and lasting contributions to teams developing software for diverse purposes. My experience as an interdisciplinary scientist, a teacher, and a self-taught programmer makes me sensitive to the ways that other people – whether collaborators or customers – think and communicate, and leads me to document my work carefully. I love style guides, code reviews, literature searches, and long hikes in the woods. I thrill to tricky technical problems that require insight and teamwork to solve. I am committed to using my skills and privileges to make the world a more just, sustainable, and creative place, and I seek out opportunities to work with people that share that commitment.

Software Engineering & Research

2016, 2013 **Research Consultant** — Rhode Island Hospital (Bioengineering Lab, Orthopaedics Dept)

- Diagnosed and resolved bugs in custom software triggered by topological artifacts in triangle meshes derived from MRI data. This enabled my client researchers to use a new and more sensitive technique for measuring cartilage thickness in pre-clinical trials for several years after my work.
- Built an extensible GUI application to allow non-programmers to use a custom software pipeline for MRI data processing.

2015 – 2006 **Graduate Researcher** — Brown University (Visualization Research Lab, Computer Science Dept)

- Designed a technique for model optimization in infinite-dimensional configuration spaces with both discrete and continuous parameters, supporting metaheuristics like simulated annealing.
- Created a mathematical model of brain structure and a GPU-accelerated algorithm to render synthetic MRI images from it.
- Collaborated across disciplines with scientists in Providence, RI; St. Louis, MO; Edinburgh; and Cape Town.
- Made frequent presentations, including over 25 one-hour talks given to my research group and others.

2011 **Software Engineer** — Google

- Back-end design, development (with MapReduce), and deployment of a customer-facing user interface for latency analytics, which shipped on my final day.

2008 – 2002 **Engineering Technician** — Avid Technology

- Research and development of algorithms for video deinterlacing (machine learning), scene reconstruction (computer vision), and cryptographic steganography.
- Earlier projects included video codec evaluation; development of in-house codec testing workflow software; migration of the full corporate codebase to the Visual Studio .net compiler; software refactoring and optimization; software quality assurance; and network and hardware construction and maintenance.

Teaching

2016 – 2015 **Instructor** — Phillips Academy (Math/Stats/CS Dept)

- Taught *AP CS*, *Software Design*, *Computer Graphics*, and *Data Structures*.
- Designed the graphics course from scratch: a bottom-up approach in Python/Numpy and WebGL.
- Advised two teams, of three students each, on independent term-long projects: *PACTF* and *Combinatorial Optimization*.

2015 – 2013 **Visiting Instructor** — Carleton College (Computer Science Dept)

- Taught *Intro*, *Data Structures*, *Discrete Math*, *Algorithms*, and *Software Design*.
- Designed and taught an elective: *Medical Image Analysis*. Significantly redesigned *Data Structures*.
- Advised five student research assistants for two trimesters; advised three teams of seniors on two-trimester capstone projects; academic advisor for fourteen majors for one year. Managed undergraduate graders for most courses.

2013 **Instructor** — Brown University (Computer Science Dept)

- Taught *Intro to Computation for the Humanities and Social Sciences* and managed four undergrad TAs.

Education

2015 **PhD in Computer Science** — Brown University

- Dissertation: *A Multi-Scale Model of Brain White-Matter Structure and Its Fitting Method for Diffusion MRI*.

2008 **ScM in Computer Science** — Brown University

2006 **B.S. with Distinction in Computer Science, B.S. in Mathematics** — Duke University

Mentoring

2016 **Co-Lead Mentor** — Code for Philly

- Mentored a cohort of 14 early-career software developers in the DatJawn project.
- Designed a 20-week curriculum in data structures, distributed systems, and software development.

2011 – 2009 **Academic Mentor** — New Urban Arts

- Mentored approximately a dozen high-school students in math and science at an open-door urban community art studio.

Skills

Programming and Markup Languages

- Professional: C/C++, Matlab, Python/Numpy, LaTeX.
- Proficient: compliant HTML, CSS, Java.
- Familiar: GLSL, Make, Javascript, Go, PHP, SVG, bash, csh, SuperCollider, Processing.

Software / Libraries

- Professional: Debian/Ubuntu Linux, Mac OS X.
- Proficient: Windows XP, Eclipse, Visual Studio, Photoshop, Inkscape.
- Familiar: OpenGL, JUnit, Git, Subversion, CVS, ClearCase.

Publications & Presentations

Journal Papers

- A. Gongvatana, R. Cohen, S. Correia, K.N. Devlin, J. Miles, H. Kang, H. Ombao, B. Navia, D.H. Laidlaw, and K.T. Tashima. "Clinical Contributors to Cerebral White Matter Integrity in HIV-Infected Individuals". *Journal of Neurovirology*, 17(5):477–486, 2011 .
- R. Boller, S.A. Braun, J. Miles, and D.H. Laidlaw. "Application of Uncertainty Visualization Methods to Meteorological Trajectories". *Earth Science Informatics*, 3(1–2):119–126, June 2010 .
- D.F. Keefe, D. Acevedo, J. Miles, F. Drury, S.M. Swartz, and D.H. Laidlaw. "Scientific Sketching for Collaborative VR Visualization Design". *IEEE Transactions on Visualization and Computer Graphics*, 14(4):835–847, Jul–Aug 2008 .

Refereed Posters, Workshops, and Invited Talks

- J. Miles and D.H. Laidlaw. "Predicting DTI Tractography Uncertainty from Diffusion-Weighted-Image Noise". Poster at ISMRM 2012.
- R. Boller, S. Braun, J. Miles, and D. Laidlaw. "Application of Uncertainty Visualization Methods to Meteorological Trajectories". Talk at NASA/AGU Earth and Space Science Informatics Workshop, University of Maryland, Baltimore County. August 2009.
- J. Miles. "A Specialized Inter-Curve Similarity Measure for Agglomerative Diffusion MRI Streamline Clustering". Invited talk at the NIH Section on Tissue Biophysics and Biomimetics. May 2009.
- J. Miles, R.A. Cohen, and D.H. Laidlaw. "Tradeoffs in Supersampling of DTI Metrics". Poster at ISMRM 2009.
- J. Miles, D.F. Keefe, D. Acevedo, F. Drury, S.M. Swartz, and D.H. Laidlaw. "Teaching Science in Virtual Reality with a Freehand 3D Illustration". Poster at IEEE InfoVis 2007.

Instructional Workshops

- J. Miles. "Regular Expressions, Text Processing, and Web Scraping", a two-hour Python tutorial for research librarians at The Humanities and Technology Camp, New England at Brown University. October 2012.
- J. Miles. "Fibbly Math Patterns", a one-hour classroom workshop for elementary- and middle-school–age students. Facilitated ten sessions total in Damariscotta, ME and Philadelphia, PA. November 2011 – January 2013.
- A. Gongvatana, J. Miles. "Diffusion MRI: Theory and Practice", a three-hour workshop in the Biostatistics Program, Department of Public Health, Brown University. October 2010.