

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.

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## Software Engineering & Research

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| 2016,<br>2013 | <b>Research Consultant</b>  | Rhode Island Hospital<br>(Bioengineering Lab,<br>Orthopaedics Dept)        |
|               | <ul style="list-style-type: none"><li>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.</li><li>Built an extensible GUI application to allow non-programmers to use a custom software pipeline for MRI data processing.</li></ul>  |  |
| 2015<br>2006  | <b>Graduate Researcher</b>  | Brown University<br>(Visualization Research Lab,<br>Computer Science Dept) |
|               | <ul style="list-style-type: none"><li>Designed a technique for model optimization in infinite-dimensional configuration spaces with both discrete and continuous parameters, supporting metaheuristics like simulated annealing.</li><li>Created a mathematical model of brain structure and a GPU-accelerated algorithm to render synthetic MRI images from it.</li><li>Collaborated across disciplines with scientists in Providence, RI; St. Louis, MO; Edinburgh; and Cape Town.</li><li>Made frequent presentations, including over 25 one-hour talks given to my research group and others.</li></ul> |  |
| 2011          | <b>Software Engineer</b>  | Google   |
|               | <ul style="list-style-type: none"><li>Designed, developed, and deployed the MapReduce back end of a customer-facing user interface for latency analytics, which went live on my final day.</li></ul>  |  |
| 2008<br>2002  | <b>Engineering Technician</b>   | Avid Technology  |
|               | <ul style="list-style-type: none"><li>Researched and developed algorithms for video deinterlacing (machine learning), scene reconstruction (computer vision), and cryptographic steganography.</li><li>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.</li></ul>  |  |
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## Teaching

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| 2016<br>2015 | <b>Instructor</b>   | Phillips Academy<br>(Math/Stats/CS Dept)    |
|              | <ul style="list-style-type: none"><li>Taught AP CS, <i>Software Design</i>, <i>Computer Graphics</i>, and <i>Data Structures</i>.</li><li>Designed the graphics course from scratch: a bottom-up approach in Python/Numpy and WebGL.</li><li>Advised two teams, of three students each, on independent term-long projects: <i>PACTF</i> and <i>Combinatorial Optimization</i>.</li></ul>  |   |
| 2015<br>2013 | <b>Visiting Instructor</b>  | Carleton College<br>(Computer Science Dept) |
|              | <ul style="list-style-type: none"><li>Taught <i>Intro</i>, <i>Data Structures</i>, <i>Discrete Math</i>, <i>Algorithms</i>, and <i>Software Design</i>.</li><li>Designed and taught an elective: <i>Medical Image Analysis</i>. Significantly redesigned <i>Data Structures</i>.</li><li>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.</li></ul> |   |
| 2013         | <b>Instructor</b>   | Brown University<br>(Computer Science Dept) |
|              | <ul style="list-style-type: none"><li>Taught <i>Intro to Computation for the Humanities and Social Sciences</i> and managed four undergrad TAs.</li></ul>   |   |
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## Education

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| 2015 | <b>PhD in Computer Science</b>   | Brown University |
|      | <ul style="list-style-type: none"><li>Dissertation: <i>A Multi-Scale Model of Brain White-Matter Structure and Its Fitting Method for Diffusion MRI</i>.</li></ul> |                  |
| 2008 | <b>ScM in Computer Science</b>   | Brown University |
| 2006 | <b>B.S. with Distinction in Computer Science, B.S. in Mathematics</b>  | 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 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, Bash, Javascript, Go, SQL, PHP, Perl, SVG, SuperCollider, Processing.

### Software and 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.