Caroline Ring

www.carolinering.com
caroline.ring@gmail.com

EXPERIENCE

Ph.D Research, Biomedical Engineering, Duke University; Durham, NC *2005–2014*

- Dissertation work: **Improved techniques** to **include real-world population variability in computational models** of heart rhythm (MATLAB and C++), allowing more **realistic, clinically-relevant interpretation** of model results. **Uncertainty quantification** and **sensitivity analysis** techniques: **polynomial chaos** and **Monte Carlo**. Statistical methods including **Bayesian inference**, **non-parametric** methods including **kernel density estimation, hypothesis testing**, **ANOVA/ANCOVA**, **multiple and nonlinear regression. Developed data analysis algorithms and tools** using MATLAB, R, Python, Mathematica, shell scripting, awk. Developed **novel visualizations of variability** in model results using MATLAB and Adobe Illustrator.
- Other work: **Model development** of **Hodgkin-Huxley style** model of ionic current, incorporated into existing models of cardiac action potential; estimated model parameters from experimental data. Also worked with **cellular automaton** model of cardiac conduction and **Markov chain** models of ion channels. **Developed graphical data analysis tool** in MATLAB for **signal processing** and analysis of experimental *in vitro* cardiac data; **improved usability and flexibility** over previously-used LabView tool.

Junior Editor (Independent Contractor), American Journal Experts; Durham, NC *2011; 2014-present*

- **Copyedited confidential bioengineering manuscripts** from international authors with limited English proficiency for submission to U.S. and U.K. journals. Performance consistently rated 4.25 out of 5 or better. **Consistently met 24- and 72-hour deadlines** for multiple weekly assignments. **Worked remotely with managing editors and translators across the U.S.** using only electronic communication.

Programmer and Data Analyst, Mediwave Star Technology; Greensboro, NC *2004–2005*

- With no previous FORTRAN knowledge, given ~1500 lines of existing FORTRAN code for ECG analysis software. Within 4 weeks, was **developing algorithms for signal processing and data analysis** with new assignments from Chief Science Officer weekly. **Accelerated algorithm prototyping ~50%** within 4 weeks after migrating to Python (no previous Python knowledge), working by e-mail and phone with New Mexico team member. **Wrote successful SBIR grant application** with Chief Science Officer and local and remote team members. **Trained two new hires** in FORTRAN and Python data analysis.

EDUCATION

Ph.D (Biomedical Engineering), Duke University	September 2014
M.S. (Biomedical Engineering), Duke University	May 2010
B.S. (Physics), University of North Carolina at Greensboro	May 2004

PUBLICATIONS

Caroline L. Ring, Wanda Krassowska Neu, and Omar M. Knio. "Uncertainty in the Bifurcation Diagram of Cardiac Action Potential Duration." In *Dynamics Days US 2014: Book of Abstracts*, page 139, 2014. **http://www.ddays2014.gatech.edu/booklet.pdf**

Caroline L. Ring, David Schaeffer, and Wanda Krassowska Neu. "Effect of strength-interval relationship on cardiac rhythm dynamics in a one-dimensional mapping model." In *Dynamics Days 2011: Abstracts*, pages 32-33, 2011. **http://www.math.duke.edu/conferences/DDays2011/abstracts.pdf**

Caroline L. Ring, Salim F. Idriss, and Wanda Krassowska Neu. "Variability of action potential duration in pharmacologically induced long QT syndrome type 1." In *Conference proceedings : Annual International Conference of the IEEE Engineering in Medicine and Biology Society IEEE Engineering in Medicine and Biology Society Conference*, vol. 2009, pp. 4520-4522, 2009.