CURRICULUM VITAE

Brian Robert Keating, Ph.D.

PERSONAL INFORMATION

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EDUCATIONAL HISTORY

College of William & Mary, Williamsburg, Virginia
  Major: Computational Fluid Physics
  Degree: Ph.D., August 2007
  Dissertation: "Stabilization Methods for High Reynolds Number Lattice Boltzmann Simulations"

College of William & Mary, Williamsburg, Virginia
  Major: Physics
  Degree: M.S., May 2005

Saint Mary's College of Maryland, Saint Mary's City, Maryland
  Major: Physics
  Degree: B.A., *magna cum laude*, May 2003

ACADEMIC POSITIONS

Assistant Researcher, (5/11 – 5/14)
Department of Medicine, University of Hawaii at Manoa, Honolulu, Hawaii

Responsibilities: Developed methods for correcting intrascan head motion in anatomical MRI sequences. Implemented a motion-compensated diffusion-weighted imaging sequence in order to recover signal in the presence of head motion. Adapted existing motion-correction technology for use on a neonatal population.

Supervisor: Thomas Ernst, Ph.D.

MR Research Specialist, (5/08 – 05/11)
Department of Medicine, University of Hawaii at Manoa, Honolulu, Hawaii

Responsibilities: Developed a navigated scan sequence/image reconstruction program for prospective correction of patient motion for use in MR spectroscopy and MRI sequences. Created real-time dynamic shimming module to improve MR spectral quality in the presence of motion.

Supervisor: Thomas Ernst, Ph.D.

Visiting Scholar, (9/07 – 2/08)
Department of Ocean & Resources Engineering, University of Hawaii at Manoa, Honolulu, Hawaii

Responsibilities: Numerical investigation of marine hydrodynamical flows. Used the Lattice Boltzmann method to examine both depth-averaged shallow water flows and breaking waves. Simulations carried out on serial computers as well as on a Linux cluster. Tested the numerical stability and accuracy of several new wave run-up schemes.

Supervisor: Jannette Frandsen, Ph.D.

Research Assistant, (6/05 – 8/07)
Department of Physics, College of William & Mary, Williamsburg, Virginia

Responsibilities: Performed research involving the Lattice Boltzmann method (LBM) for high Reynolds number Navier-Stokes and magnetohydrodynamical flows. Ran Fortran 90 simulations on both serial and massively parallel machines. Specifically examined entropic stabilization, non-uniform grids, subgrid modeling, implicit methods and novel boundary condition implementation, all within the context of the LBM.

Supervisor: George Vahala, Ph.D.

Research Assistant, (6/04 -6/05)
Department of Physics, College of William & Mary, Williamsburg, Virginia

Responsibilities: Carried out research involving the structure of the nucleon. Examined the anomalous magnetic moment of the nucleon in effective field theory via the Gerasimov-Drell-Hearn sum rule.

Supervisor: Marc Vanderhaeghen, Ph.D.

Teaching Assistant, (1/04 -5/04)
Department of Physics, College of William & Mary, Williamsburg, Virginia

Responsibilities: Ran three laboratory sections of undergraduate general physics. Responsibilities included preparing experimental setups, teaching the theoretical background to non-majors, performing demonstrations, and grading. Revised the laboratory manual.

Supervisor: Robert Welsh, Ph.D.

Research Assistant, (5/01 -8/01)
Department of Physics, Saint Mary's College of Maryland, Saint Mary's City, Maryland

Responsibilities: Performed optical experiments relating to total internal reflection rainbows that are produced when a light source is located inside a water droplet. Examined the caustiork with users to develop data visualizations, provide training on visualization software, and develop customized data-visualization tools. To inquire about visualization consulting services, plecs formed by light refraction through a meniscus via experiment and ray tracing simulations.

Supervisor: Charles Adler, Ph.D.

PROFESSIONAL SOCIETIES

Treasurer-Elect of the Motion Correction Study Group of the International Society for Magnetic Resonance in Medicine (2014)

Member, International Society for Magnetic Resonance in Medicine (2011-2015)

Student Member, International Society for Magnetic Resonance in Medicine (2009-2011)

Member, American Physical Society (2006-2010)

GRANT SUPPORT

Principle investigator, "Development of a Motion-Corrected MRI Sequence for Quantitative Imaging of Methamphetamine-Exposed Neonates," NIH grants 5G12 RR003061-26 and 8G12 MD007601-26, $50,000, 4/1/2012-7/31/2012

PUBLICATIONS

Reverse Retrospective Motion Correction. Benjamin Zahneisen, **Brian Keating**, Aditya Singh, Michael Herbst and Thomas Ernst. Accepted for publication in *Magnetic Resonance in Medicine*.

Optical Tracking With Two Markers for Robust Prospective Motion Correction for Brain Imaging. Accepted for publication in *Magnetic Resonance Materials in Physics, Biology and Medicine*.

Comparison of Optical and MR-based Tracking. Kazim Gumus, **Brian Keating**, et al. *Magnetic Resonance in Medicine* (available online in early view)

Schizophrenia-risk variant rs6994992 in the neuregulin-1 gene on brain developmental trajectories in typically-developing children. With Vanessa Duet, et al. *Translational Psychiatry*, **4**, e392 (2014)

Propagation of Calibration Errors in Prospective Motion Correction Using External Tracking. Benjamin Zahneisen, **Brian Keating** and Thomas Ernst. *Magnetic Resonance in Medicine*, **72**(2), 381 (2014)

Prevention of Motion-Induced Signal Loss in Diffusion-Weighted EPI by Dynamic Restoration of Gradient Moments. Kazim Gumus, **Brian Keating**, Benedikt A. Poser, Brian Armstrong, Julian Maclaren, Thomas Prieto, Oliver Speck, Maxim Zaitsev, and Thomas Ernst. *Magnetic Resonance in Medicine*, **71**(6), 2006 (2014)

Real-time Dynamic Frequency and Shim Correction for Single-Voxel Magnetic Resonance Spectroscopy. **Brian Keating** and Thomas Ernst. *Magnetic Resonance in Medicine*, **68**(5), 1339 (2012)

Prospective Motion Correction for Single-Voxel ^{1}H MR Spectroscopy. **Brian Keating**, Weiran Deng, J. Cooper Roddey, Nathan White, Anders Dale, V. Andrew Stenger and Thomas Ernst. *Magnetic Resonance in Medicine*, **64**(3), 672 (2010)

Entropic, LES and Boundary Conditions in Lattice Boltzmann Simulations of Turbulence. George Vahala, **Brian Keating**, Min Soe, Jefferey Yepez, Linda Vahala and Sean Ziegeler. *The European Physical Journal, Special Topics*, **171**, 167 (2009)

Entropic Lattice Boltzmann Representations Required to Recover Navier-Stokes Flows. **Brian Keating**, George Vahala, Jeffrey Yepez, Min Soe and Linda Vahala. *Physical Review E* **75**, 036712 (2007)

Analysis of the Shadow-Sausage Effect Caustic. James A. Lock, Charles Adler, Jonathan Mulholland, **Brian Keating** and Diana Ekelman. Applied Optics, **42** 418 (2003)

Experimental measurement of total internal reflection rainbows. Charles Adler, James A. Lock, Jonathan Mulholland, **Brian Keating** and Diana Ekelman. Applied Optics, **42** 406 (2003)

CONFERENCE PRESENTATIONS

B. Keating, A. Singh, B. Zahneisen, L. Chang and T. Ernst. Predictive Filtering for Improved Robustness in Prospective Motion Correction. Presented at the 22nd annual meeting of the International Society for Magnetic Resonance in Medicine. (May 2014)

B. Keating and T. Ernst. Correction of Motion-Induced Phase Variance in Single-Voxel ^{1}H Spectroscopy. Presented at the 21st annual meeting of the International Society for Magnetic Resonance in Medicine. (April 2013)

B. Keating. Adaptive Motion and Shim Correction for Single-Voxel Spectroscopy. Oral presentation given at the IDEA Users Meeting. (June 2012)

B. Keating and T. Ernst. Real Time Dynamic Shimming for MR Spectroscopy Using 2-dimensional RF Excitations. Oral Presentation given at the 19th annual meeting of the International Society for Magnetic Resonance in Medicine. (May 2011)

L. Anderson, L. Chang, S. Buchthal, **B. Keating**, C. Cloak, T. Ernst. Early Neonatal Brain Development: Correlation between DTI and MRS. Presented at the 18th annual meeting of the International Society for Magnetic Resonance in Medicine. (May 2010)

B. Keating and T. Ernst. Motion-Induced Frequency and Shim Variations during Localized ^{1}H MR Spectroscopy with Prospective Motion Correction. Presented at the 18th annual meeting of the International Society for Magnetic Resonance in Medicine. (May 2010)

B. Keating and T. Ernst. Real-Time Dynamic Shimming for Localized ^{1}H Spectroscopy. Oral presentation at the International Society for Magnetic Resonance Motion Tracking workshop. (February 2010)

B. Keating, J. C. Roddey, W. Deng, A. Dale, N. White, V. A. Stenger, and T. Ernst. 3-D Prospective Motion Correction for MR Spectroscopy. (April 2009). E-poster 6671, presented at the 17th annual meeting of the International Society for Magnetic Resonance in Medicine.

M. Soe, **B. Keating**, G. Vahala, J. Yepez, L. Vahala. Large Eddy – Lattice Boltzmann (LE-LB) Simulation of Fluid and MHD Turbulence. (July 2007). Talk given by G. Vahala at the Discrete Simulation of Fluid Dynamics Conference.

B. Keating, G. Vahala, L. Vahala and M. Soe. Large Eddy Simulations of MHD Using the Lattice Boltzmann Algorithm. (April 2007). Poster presented at the Sherwood Fusion Theory Conference.

L. Vahala, G. Vahala and **B. Keating**. Quasi-Equilibria Lattice Boltzmann Schemes for MHD Turbulence. (April 2007). Poster presented at the International Sherwood Fusion Theory Conference.

B. Keating, G. Vahala, L. Vahala, M. Soe, J. Yepez. Entropic Lattice Boltzmann Simulations of Turbulence. (October 2006). Poster presented at the annual meeting of the Division of Plasma Physics.

N. Phillips, **B. Keating**, G. Vahala, L. Vahala. MHD Turbulence, divB=0 and Lattice Boltzmann Simulations. (November 2006). Poster presented at the annual meeting of the Division of Plasma Physics.

B. Keating, G. Vahala, J. Carter, M. Soe, L. Vahala and J. Yepez (April 2006). Unconditionally Stable Lattice Boltzmann Schemes for 3D MHD. Poster presented at the Sherwood Fusion Theory conference.