Kyle Michael Keane

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EDUCATION

PhD, Physics	University of California, Riverside	2012
MS, Physics	University of California, Riverside	2009
BS, Physics (*Cum Laude*)	California State University, Fullerton	2007

WORK EXPERIENCE

Research Programmer Wolfram Research Incorporated Nov 2012 – present

Developed multiple business partnerships and created new fiscal models to accommodate the unique complications of the accessibility market. Designed research projects that will further the field of digital accessibility. Wrote grant and project proposals for acquiring funding to build a team of people to work on these projects. Contributed code to the development of Wolfram|Alpha. Built prototypes and proof-of-concepts of many products. Supported educational initiatives through prototyping useful products and giving presentations at conferences. Presented trainings for interactive digital publishing on the web and in classrooms using Wolfram's *CDF Player* and for using Wolfram's main product *Mathematica* for deploying interactive educational materials. Represented Wolfram Research at trade shows, conferences, and industry networking events.

R&D Fellow Wolfram Research Incorporated July 2012 – Nov 2012

Performed a comprehensive review of the accessibility of all Wolfram's current and in-development software products. Worked with technical leads to develop a tiered development plan to improve the accessibility of all products and guide future product releases. Prepared Section 508 Voluntary Product Accessibility Templates for all major products and oversaw their distribution on the corporate website. Created a functioning workaround for completely blind users to access *Mathematica*'s computational capabilities. Prototyped, implemented, and presented a talk about creating accessible interactive digital content in Wolfram's interactive publishing format.

Graduate Student Researcher University of California, Riverside January 2009 – July 2012

My theoretical research in Alexander Korotkov's physics group focused on Weak Quantum Measurements, Uncollapsing, Quantum Error Correction/Detection, Decoherence Suppression, Quantum State/Process Tomography, and their applications for Quantum Computation and Communication. Developed experimentally-realizable procedures that were applicable to a wide range of emerging technologies and performed analysis focusing on their implementation in superconducting systems. Activities: presented weekly updates on current progress and findings, assisted colleagues in developing their own research process, problem solving skills, and communication styles, prepared manuscripts for publication, and performed general organizational, training, and bureaucratic duties.

Teaching Assistant University of California, Riverside March 2010 - June 2010
September 2007 - December 2008

Instructed laboratory classrooms and led supplemental conceptual physics discussions. Developed and delivered lectures. Structured classes for engaged student-based learning. Evaluated student performance and consulted with students regarding course progress. Created grading rubrics for laboratory notebooks. Developed and evaluated weekly quizzes. Held regular office hours. Guided discussions of relevant topics in physics. Courses: Intro calculus-based classical mechanics lab, Intro algebra-based electricity and magnetism lab, Intro calculus-based electricity and magnetism lab, Intro algebra-based classical mechanics lab, Intro calculus-based modern physics discussion.

Undergraduate Researcher California State University, Fullerton August 2005 – August 2007

My experimental research in Dr. Murtadha Khakoo's physics group focused on high-precision measurement of differential cross-sections for electron impact on various targets. Machined a rotary table with highly-controllable angular resolution. Responsibilities: maintain, repair, and fabricate laboratory equipment in a large experimental physics group. Troubleshoot, diagnose, and remediate issues with a wide array of technical instrumentation, basic lab equipment, hardware, and software.

Physics Tutor California State University, Fullerton September 2005 - June 2007

Assisted undergraduate major and non-major students in acquisition and comprehension of material for various physics classes. Helped students from various backgrounds to complete lecture and laboratory assignments. Created drills, study aids, and other assistive interventions for students at all levels.

RESEARCH EXPERIENCE AND INTERESTS

Effectiveness of Computer Programming to Bolster STEM Learning – PI: Kyle Keane, Wolfram Research. Activities: Submitted proposal to study the effective use of interactive graphics in education. This project is still waiting to be funded.

Pedagogy of Interactive STEM Graphics – PI: Kyle Keane, Wolfram Research. Activities: Submitted proposal to study the effective use of interactive graphics in education. This project is ready, but still waiting to be funded.

Accessibility of Interactive STEM Graphics – PI: Kyle Keane, Wolfram Research. Activities: Designed, proposed, and received funding to develop a guide of best practices for providing an equivalent experience to blind people using interactive graphics within STEM disciplines. Recruited, hired, and trained an intern who performed a full documentation and literature review of relevant technologies.

Quantum Error Detection and Correction – PI: Dr. Alexander Korotkov, UCR. Activities: Analytically developed quantum error detection algorithms for current superconducting-qubit technology. Simulated experiment to verify feasibility.

Weak Measurements – PI: Dr. Alexander Korotkov, UCR. Activities: Simulated past experiment to explain observed results. Developed a novel decoherence suppression algorithm involving weak measurement reversal.

Frustrated Magnetism – PI: Dr. Kirill Shtengel, UCR. Activities: Developed algorithm to find analytical solution to complex combinatorial problems. Optimized and implemented orthonormalization of large complex vector spaces.

Biophysics-Virus Formation – PI: Dr. Roya Zandi, UCR. Activities: Investigated numerical simulations of biophysical self-assembly at finite temperature.

Physics Education Research – PI: Dr. Michael Loverude, CSUF. Acitivites: Interpreted student answers on pedagogical-development quizzes and logged for statistical analysis.

Electron Scattering – PI: Dr. Murtadha Khakoo, CSUF. Activities: Designed and built a precision vibration-resistant rotary table for an electron scattering spectrometer. Designed and implemented a new data importation and analysis procedure.

PROFESSIONAL CONFERENCES ATTENDED

ATIA Annual Meeting: 2014 Orlando, FL
Joint Mathematics Meeting: 2014 Baltimore, MD
AAAS Annual Meeting: 2013 Boston, MA, 2014 Chicago, IL
Wolfram Technology Conference: 2012 Champaign, IL. 2013 Champaign, IL
LearnLaunch: 2013 Boston, MA. 2014 Boston, MA
March Meeting of the American Physical Society: 2010 Portland, OR, 2011 Dallas, TX, 2012 Boston, MA
Coherence in Superconducting Qubits (Army Research Office): 2010 San Diego, California
Quantum Computation and Quantum Algorithms Program Review (IARPA): 2009 Minneapolis, Minnesota
DAMOP Meeting of the American Physical Society: 2007 Calgary, Canada

PRESENTATIONS

Panel Member, "What's Next in Accessible STEM Learning Materials and Assessment," January 29, 2014, at the ATIA annual meeting, Orlando, Florida

Panel Member, "Assistive Technologies for Math Students and Faculty with Disabilities," January 15, 2014, at the Joint Mathematics Meeting, Baltimore, Maryland

Conference Speaker, "Standardizing Textual Descriptions of Interactive Graphics: A Plea to Support More Robust Verbosity," October 30, 2013, at the EDUPUB Workshop, Boston, Massachusetts

Workshop Leader, "Physics Comes Alive with Wolfram Technologies," September 12, 2013, at the Wolfram Virtual Conference for Educators, Online

Conference Speaker, "Creating Accessible Dynamic Content," October 17, 2012, at the Wolfram Technology Conference, Champaign, Illinois

Colloquium Speaker, "Beyond Traditional Quantum Measurement: A Game of Quantum Peek-a-Boo with a Purpose," November 5, 2011, at the CSUF Department of Physics Colloquium, Fullerton, California

Presentation: Kyle Keane, Alexander N. Korotkov, "Currently realizable quantum error detection/correction algorithms for superconducting qubits" Bull. Amer. Phys. Soc. D29.14 (2011)

Presentation: Kyle Keane, Alexander N. Korotkov, "Decoherence suppression of a solid state qubit by uncollapsing," Bull. Amer. Phys. Soc. Z33.11 (2010)

Presentation: Kyle Keane, Shayne Cairns, Colin Campbell, Murtadha A. Khakoo "Elastic Differential Cross sections for electron scattering from polyatomic molecules—an accurate, but novel application of the relative flow technique, using a moveable aperture source of gas atoms," Bull. Amer. Phys. Soc. Q3.3 (2007)

Poster: Kyle Keane, Alexander N. Korotkov, "Suppression of T1-type decoherence of phase qubits using uncollapsing and quantum error detection/correction," presented April 26, 2010, at Coherence in Superconducting Qubits

Poster: Alexander N. Korotkov, Kyle Keane, Ricardo Pinto, "Theoretical analysis of phase qubits," presented August 19, 2009, at Quantum Computing and Quantum Algorithms Program Review

Poster: Brent R. Yates, Kyle Keane, Murtadha A. Khakoo, "Low energy impact ionization of neon and xenon," Bull. Amer. Phys. Soc. Y1.38 (2009)

Commencement Speaker, "Look to this Day", June 15, 2007, at the CSUF College of Natural Sciences and Mathematics commencement ceremony, Fullerton, California.

Poster: Murtadha A. Khakoo, Kyle Keane, Colin Campbell, Shayne Cairns, "An accurate, but novel application of the relative flow technique, using a moveable aperture source of gas atoms to measure elastic electron scattering differential cross sections," Bull. Amer. Phys. Soc. R1.99 (2007)

REFEREED PUBLICATIONS

Kyle Keane, Quantum State Protection and Transfer Using Superconducting Qubits, Doctoral Dissertation retrieved from http://escholarship.org/uc/item/8nq7q2hn

Kyle Keane and Alexander Korotkov, "Simplified quantum error detection and correction for superconducting qubits," Phys. Rev. A **86**, 012333 (2012)

Alexander N. Korotkov and Kyle Keane, "Decoherence suppression by quantum measurement reversal," Phys. Rev. A **81**, 040103(R) (2010)

B R Yates, K Keane, and M A Khakoo, "Near-threshold electron impact doubly differential cross sections for the ionization of neon and xenon," J. Phys. B: At. Mol. Opt. Phys. **42**, 095206 (2009)

M A Khakoo , J Blumer, K Keane, C Campbell, H Silva, M C A Lopes, C Winstead, V McKoy, R F da Costa, L G Ferreira, M A P Lima, and M H F Bettega, "Low-energy electron scattering from methanol and ethanol," Phys. Rev. A **77**, 042705 (2008)

M A Khakoo, K Keane, C Campbell, N Guzman, and K Hazlett, "Low energy elastic electron scattering from ethylene," J. Phys. B: At. Mol. Opt. Phys. **40**, 3601 (2007)

PROFESSIONAL SKILLS

Computer Languages (expert): Mathematica

Computer Languages (familiar): C/C++, Python, Lua, HTML/CSS, JavaScript, Fortran

Procedural Skills: Designed data analysis template for electron scattering experiment; Quantum simulations (numerical and analytical work); Matrix differential equations; Manuscript preparation; Prototype creation; Public Speaking

Laboratory Skills: Advanced Machining (Lathe, Mill, Tapping); Built precision rotary table and vibration resistant supports for an electron scattering spectrometer; Basic Electronics (Design, Soldering, Wiring)

Organizational Skills: Started and organized a weekly graduate student colloquium; Started and maintained a weekly physics department soccer match; Organized and led a free weekly yoga class for fellow graduate students; Initiated and maintain a Hacker Night for interested coworkers

COMMUNITY SERVICE

Volunteer	Foundation Fighting Blindness	2008 – present
	VIStars	2013 – present
	Blindness Support Services	2010, one time
	Braille Institute	2006
	Salvation Army	2006
	Goodwill	2006
Yoga Instructor	UC Riverside, Wellness Center	2010 - 2012
Facilitator	UC Riverside, Services for Student with Disabilities	2010 - 2012
Musician	Various Community Centers	2010 - 2012

Physics Club Officer	California State University, Fullerton	2006 - 2007
Camp counselor	Foundation for the Junior Blind	2002

HONORS AND AWARDS

Molly Adams Scholarship, University of California, Riverside (2009)
Chancellor's Distinguished Fellowship, University of California, Riverside (2007)
Norman Nitzburg Award in Experimental Physics, California State University, Fullerton (2007)
Wolfram Award in Computational Science, California State University, Fullerton (2007)
Outstanding Scholarship Award, California State University, Fullerton (2007)
Dan Black Scholarship, California State University, Fullerton (2007)
Norman Nitzburg Award in Experimental Physics, California State University, Fullerton (2006)
Dan Black Scholarship, California State University, Fullerton (2006)
Kellogg Scholar, California Polytechnic University, Pomona (2002)
California Governor's Scholarshare Award, Ruben S. Ayala High School (2002)

CERTIFICATIONS

Certified Yoga Instructor (CYT-200) Cloud Nine Yoga School, Fullerton, Ca 2011

LANGUAGES

English (native speaker)
Spanish (basic conversation and reading, not actively maintained yet functional)
Sanskrit (basic writing and reading, not actively maintained)