

VIGRE Funding Proposal — Part I — Spring 2010

Name: John Kerl

Program: Math

Academic year funding requested: Spring 2010

Summer funding requested: (1 or 2 months) No

Year of entry into PhD program: Fall 2005

Date of passing the PhD qualifying examinations: August 2007

Date and result of oral comprehensive examination: Pass, January 2009

Who is your dissertation advisor, if you have one? Tom Kennedy

Research summary: I utilize methods including Markov chain Monte Carlo, high-performance computing, statistics, and finite-size scaling to determine the critical temperature of phase transitions for a simplified model of the Bose gas.

Previous funding:

Fall '09:	VIGRE support
Summer '09:	VIGRE support
Spring '09:	NSF grant DMS-0601075
Fall '08:	Math dept. TA, Calculus I
Spring '08:	NSF grant DMS-0601075
Fall '07:	Graduate computing assistant
Spring '07:	Math dept. TA, Calculus I
Fall '06:	Math dept. TA, Trigonometry
Summer '06:	Qualifying-exam support (through VIGRE)
Spring '06:	Math dept. TA, College Algebra
Fall '05:	Math dept. TA, College Algebra

List all the activities you plan to participate in during the funded period:

Academic activities:

- Conference attendance/participation: AMS/MAA Joint Meetings, January 2010, San Francisco, CA.
- Conference attendance/participation: 23rd Annual Workshop on Recent Developments in Computer Simulation Studies in Condensed Matter Physics, February 21-26, 2010, University of Georgia, Athens, GA.

- Complete PhD (expected May 2010).

Professional development and outreach:

- I will continue to work with Tom Kennedy's multi-level (faculty, graduate students, undergraduate students) bridge group, focusing in particular on mentoring of undergraduates and junior graduates.
- I will continue to co-organize (with Tom Kennedy) the mathematical physics seminar, as I have done for fall 2009.

Talks given:

<u>Title</u>	<u>Series/conference</u>	<u>Date</u>
<i>Python for the working (or aspiring) mathematician</i>	UA Software Interest Group	Oct. 2009
<i>Critical behavior for the model of random spatial permutations</i>	UA Math. Phys. Seminar	Sep. 2009
<i>Markov Jabberwocky: fesh, excen-ture, and the like</i>	UA Grad. Colloquium	Aug. 2009
<i>Numerical methods for random spa-tial permutations</i>	Stochastic processes and their applications (Berlin)	Jul. 2009
<i>Lattice quadrupling for percolation in quantum networks</i>	Workshop on quantum spin systems and applications in quantum computation (Tucson)	Jun. 2009
<i>Remarks on interacting spatial per-mutations and the Bose gas</i>	Comprehensive examina-tion	Jan. 2009
<i>Computational methods in percola-tion</i>	UA Grad. Colloquium	Oct. 2008
<i>High-performance arithmetic</i>	UA Applied Brown Bag	Oct. 2008
<i>Lattice quadrupling for percolation in quantum networks</i>	UA Math. Phys. Seminar	Oct. 2008
<i>C for math folks</i>	UA Software Interest Group	Apr. 2008
<i>Monte Carlo methods for interacting spatial permutations</i>	UA Math. Phys. Seminar	Apr. 2008
<i>Quantum mechanics for math grads</i>	UA Grad. Colloquium	Mar. 2008
<i>The Metropolis-Hastings algorithm by example</i>	UA Grad. Probability Seminar	Feb. 2008
<i>Numerical Differential Geometry in Matlab</i>	UA Grad. Colloquium	Jan. 2008
<i>Is 2 a random number?</i>	UA Grad. Colloquium	Sep. 2007
<i>The Householder transformation, Swiss Army knife of numerical linear algebra</i>	UA Grad. Colloquium	Feb. 2007
<i>Perl for the working (or aspiring) mathematician</i>	UA Software Interest Group	Oct. 2006
<i>Tensorama</i>	UA Grad. Colloquium	Sep. 2006

<i>Concrete abstract algebra in Python</i>	UA Software Interest Group	Apr. 2006
<i>A walking tour through projective spaces</i>	UA Grad. Colloquium	Mar. 2006
<i>Computation in finite fields</i>	UA Grad. Colloquium	Jan. 2006
<i>Introduction to the vim text editor</i>	UA Software Interest Group	Sep. 2005
<i>Linear feedback shift registers</i>	UA Grad. Colloquium	Sep. 2005
<i>Codes and Curves</i>	Master's thesis defense	Apr. 2005
<i>High-performance arithmetic</i>	ASU/Lockheed Martin Seminar Series	Oct. 2004
<i>An introduction to coding theory for mathematics students</i>	ASU Grad. Seminar	Sep. 2004
<i>Linear feedback shift registers</i>	ASU Grad. Seminar	Apr. 2004
<i>A reference design for FPGA-based Linux applications</i>	DesignCon	Feb. 2004
<i>A reference design for embedded ucLinux on a Motorola ColdFire processor</i>	DesignCon	Feb. 2004
<i>Computation in finite fields</i>	ASU Grad. Seminar	Dec. 2003

Which seminars do you regularly attend?

- Grad student colloquium
- Mathematics colloquium
- Mathematical physics seminar

List any publications:

None to date.

Graduate coursework at the U of A:

Sem./Yr.	Course no.	Title	Grade	Instructor
Fa. '05	Math 511A	Abstract Algebra	A	Grove
Fa. '05	Math 523A	Real Analysis	B	Faris
Fa. '05	Math 534A	Geometry-topology	A	Pickrell
Fa. '05	Math 597T	Teaching workshop	A	Varecka
Sp. '06	Math 511B	Abstract Algebra	A	Grove
Sp. '06	Math 523B	Real Analysis	A	Faris
Sp. '06	Math 534B	Geometry-topology	A	Pickrell
Sp. '06	Math 597T	Teaching workshop	A	Varecka
Fa. '06	Math 528A	Banach and Hilbert Spaces	A	Fatkullin
Fa. '06	Math 559A	Lie Groups and Lie Algebras	A	Palmer
Fa. '06	Math 596G	Research Tutorial Group	A	Palmer
Sp. '07	Math 538	Special Topics (Circle Packing)	A	Glickenstein
Sp. '07	Math 559B	Lie Groups and Lie Algebras	A	Palmer
Sp. '07	Math 564	Probability	A	Kennedy
Fa. '07	Math 537A	Global Diff. Geom.	A	Glickenstein
Fa. '07	Math 563A	Theoretical Probability	A	Kennedy
Fa. '07	Math 541	Mathematical Physics	A	Wehr
Sp. '08	Math 565C	Stochastic Diff. Eqns.	A	Wehr
Sp. '08	Math 567A	Theoretical Statistics	A	Bhattacharya
Sp. '08	Math 599	Independent study (Quantum Information)	S	Wehr
Fa. '08	Math 541	Mathematical Physics	A	Kennedy
Fa. '08	Physics 570A	Quantum mechanics	B	Fleming
Fa. '08	Math 900	Research	S	Kennedy
Sp. '09	Math 566	Theory of Statistics	A	Piegorsch
Sp. '09	Math 565A	Stochastic Processes	A	Faris
Sp. '09	Math 920	Dissertation	S	Kennedy
Fa. '09	Math 920	Dissertation	TBD	Kennedy
Fa. '09	ECE 503	Probability and random processes in engineering	TBD	Vasic
Sp. '10	Math 920	Dissertation	TBD	Kennedy