

# CURRICULUM VITAE

Helmut G. Katzgraber

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<https://katzgraber.org>

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### Helmut G. Katzgraber

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#### BIOGRAPHICAL DATA

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Date and Place of Birth	July 7, 1972, Lima, Perú
Citizenship	American / Austrian / Peruvian

#### EDUCATION

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<b>Ph.D. in Physics</b>	06/1998 – 09/2001
University of California Santa Cruz (Advisor: Prof. A. Peter Young)	
<b>M.S. in Physics</b>	10/1997 – 06/1998
University of California Santa Cruz (Advisor: Prof. A. Peter Young)	
<b>Diploma in Physics (M.S. equivalent)</b>	10/1992 – 04/1997
ETH Zürich, Switzerland (Advisor: Prof. G. Blatter)	
Awards: Diploma with distinction ( <i>summa cum laude</i> ), Pólya Prize	
<b>Military Service (Austria)</b>	01/1992 – 09/1992
Österreichisches Bundesheer (Medal for outstanding service)	
<b>German Bachelors Degree</b>	03/1989 – 12/1991
Colegio Alexander von Humboldt Lima (Perú)	
Award: best student in Sciences and Mathematics	
<b>Languages:</b> English, German, Spanish (all fluent)	

#### RESEARCH & PROFESSIONAL EXPERIENCE

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<b>Principal Researcher</b>	08/2018 –
Microsoft Research, Redmond, WA	
<b>Industrial Engagements</b>	
IQB Information Technologies (head of research, optimization division), Vancouver, BC	02/2017 – 08/2018
Microsoft Research (consultant), Redmond, WA	06/2017 – 08/2018
<b>Professor</b>	
Department of Physics & Astronomy, Texas A&M University, College Station, USA	09/2015 –
<b>Faculty Member</b>	
External faculty member at the Santa Fe Institute, Santa Fe NM, USA	07/2014 – 07/2020
Visiting professor in computational physics, Coventry University, Coventry, UK	07/2015 – 07/2016
Materials Science and Engineering, Texas A&M University, College Station, USA	03/2013 – 03/2016
<b>Associate Professor (with tenure)</b>	
Department of Physics & Astronomy, Texas A&M University, College Station, USA	09/2012 – 08/2015
<b>Assistant Professor</b>	
Department of Physics & Astronomy, Texas A&M University, College Station, USA	01/2009 – 08/2012
Theoretical Physics Institute, ETH Zürich, Switzerland (SNF)	03/2007 – 03/2013
<b>Post-Doctoral Researcher</b>	
Theoretical Physics Institute, ETH Zürich, Switzerland (Advisor: G. Blatter)	10/2002 – 03/2007
Department of Physics, University of California, Davis, USA (Advisor: G. Zimanyi)	10/2001 – 10/2002
<b>Research Assistant</b>	
Department of Physics, University of California, Santa Cruz, USA	10/1997 – 10/2001
Theoretical Physics Institute, ETH Zürich, Switzerland	04/1997 – 09/1997
<b>Computer System Administrator</b>	
Department of Physics, University of California, Santa Cruz, USA	12/1997 – 01/2001

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PUBLICATION & PRESENTATION SUMMARY

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Publications (incl. 4 book chapters and 10 conference proceedings)	139
Invited talks at conferences, seminars & colloquia	180
Conference contributions (talks & posters)	54

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AWARDS

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**Pólya Prize**

Awards by ETH Zurich 1997

Best Diploma Thesis (masters equivalent) in mathematics and theoretical physics

**SNF Förderungsprofessur**

Awards by the Swiss National Science Foundation 2007

Faculty fellowship

**NSF CAREER Award**

Awards by the National Science Foundation 2012

Faculty Early Career Development Program

**Note:** Teaching/service awards are listed in the teaching/service section

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RESEARCH INTERESTS

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Quantum computing

Algorithm development and novel computing paradigms

Fundamentals of spin glasses

Disordered systems (spin, electron, quantum, vortex &amp; structural glasses)

Emulation of space radiation

General computational research (cold gases, avalanches &amp; hysteresis, single molecule magnets, ...)

**Note:** For more details visit the team website at <https://intractable.lol>


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SCIENTIFIC VISITS & EXTERNAL APPOINTMENTS

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Coventry University, Coventry, UK International Visiting Professorship Scheme	07/2015 – 07/2016
Ben-Gurion University of the Negev, Beer Sheba, Israel Distinguished Scientist Visitor Program	05/2014 – 06/2014
Chinese Academy of Sciences, Beijing, China Scientific visit	04/2012 – 05/2012
KITP University of California Santa Barbara, Santa Barbara, CA, USA Program on “ <i>Electron Glasses</i> ”	08/2010
Aspen Center for Physics, Aspen, CO, USA Program on “ <i>Complexity, Disorder, and Algorithms</i> ”	05/2008 – 06/2008
KITP University of California Santa Barbara, Santa Barbara, CA, USA Program on “ <i>Topological Phases and Quantum Computation</i> ”	04/2006 – 05/2006
Institute for Rock Magnetism, Minneapolis, MN, USA Experiments on disordered systems using a VSM	05/2002

## GRANTS

**Research Grants**

IARPA Grant (via NASA):

US\$ 2 998k

07/2017 – 07/2022, funding period: 5 years

Principal investigator (PI)

Intel FPGA University Program:

US\$ 36k

01/2017, Donation of 4 DE5-NET FPGA cards & software license

IARPA Grant (via MIT Lincoln Laboratory):

US\$ 2 194k

09/2014 – 08/2019, funding period: 5 years

Principal investigator (PI)

NSF CAREER Award Supplement (No. DMR-1421190):

US\$ 15k

06/2014 – 06/2018, funding period: 4 years

Principal investigator (PI)

TAMU ITS Grant:

US\$ 2k

08/2012, funds to develop a new computational physics course

Principal investigator (PI)

ETH Matching Grant:

CHF 30k (US\$ 33k)

granted 04/2012, co-sponsorship of a postdoctoral researcher

Principal investigator (PI)

NSF CAREER Award (No. DMR-1151387):

US\$ 475k

06/2012 – 06/2017, funding period: 5 years

Principal investigator (PI)

TAMU CA/ITF Grant:

US\$ 38k (US\$ 9k matched by the College of Science)

12/2011, purchase of a computer lab for the Physics & Astronomy Department

PI with K. Tran

SNF Faculty Fellowship Grant Renewal (No. PP02-114713):

CHF 585k (US\$ 652k)

03/2011 – 03/2013, funding period: 2 years

Principal investigator (PI)

ETH Grant (No. 0-43352-07):

CHF 1 120k (US\$ 1 249k)

granted 11/2007, purchase of a beowulf cluster

co-PI with M. Troyer, M. Parrinello, M. Kröger

SNF Faculty Fellowship (No. PP02-114713):

CHF 1 391k (US\$ 1 440k)

03/2007 – 03/2011, funding period: 4 years

Principal investigator (PI)

**Large-scale Collaborations**

Associate Partner, “*Dynamics of and in Complex Systems (DIONICOS)*,”

01/2014 – 01/2018, funding period: 4 years

PI: M. Weigel (Coventry University, Coventry, UK)

Associate Partner, “*Quantum Information Technologies Madrid (QUITEMAD)*,”

01/2010 – 01/2014, funding period: 4 years

PI: M.-A. Martin-Delgado (Universidad Complutense, Madrid, Spain)

**Supercomputing Time Allocation Grants**

NPACI Expedited Development Allocation	10 kCPUh	2001
AHPCC Allocation	50 kCPUh	2001
TACC Allocation	115 kCPUh	2008
ETH Shareholder Access	3500 kCPUh	2008
TACC Allocation	1050 kCPUh	2009
TAMU Allocation & Shareholder Access	200 kCPUh	2009
RES Allocation	500 kCPUh	2009
ETH Shareholder Access	3500 kCPUh	2009
RES Allocation	300 kCPUh	2010
TAMU Allocation	1270 kCPUh	2010
ETH Shareholder Access	3500 kCPUh	2010
TACC Allocation	1500 kCPUh	2011
TAMU Shareholder Access	840 kCPUh	2011
ETH Shareholder Access	3500 kCPUh	2011
TACC Allocation	3280 kCPUh	2012
TAMU Allocation & Shareholder Access	1940 kCPUh	2012
ETH Shareholder Access	3500 kCPUh	2012
TACC Allocation	1910 kCPUh	2013
RES Allocation	200 kCPUh	2013
TAMU Allocation & Shareholder Access	1200 kCPUh	2013
ETH Shareholder Access	420 kCPUh	2013
TACC Allocation	1790 kCPUh	2014
ETH Allocation	8510 kCPUh	2014
TAMU Allocation & Shareholder Access	3900 kCPUh	2014
ETH Shareholder Access	420 kCPUh	2014
TACC Allocation	650 kCPUh	2015
TAMU Allocation	12830 kCPUh	2015
TACC Allocation	500 kCPUh	2016
TAMU Allocation	21000 kCPUh	2016
TAMU Allocation (Curie cluster)	1000 kCPUh	2016
ORNL Allocation	5800 kCPUh	2016
TACC Allocation	800 kCPUh	2017
TAMU Allocation	20200 kCPUh	2017
TACC Allocation	8416 kCPUh	2018
TAMU Allocation	19600 kCPUh	2018
TAMU Allocation	9000 kCPUh	2019

## PUBLICATIONS

**Note:** Directly-supervised students are underlined, directly-supervised postdocs are marked with a star.

**Papers**

- 125 John Ferre, Amin Barzegar, **Helmut G. Katzgraber**, and Richard Scalettar,  
“*Distribution of inter-event avalanche times in disordered and frustrated spin systems*,”  
Phys. Rev. B, submitted (arXiv:cond-mat/1808.10497)
- 124 Maliheh Aramon, Gili Rosenberg, Toshiyuki Miyazawa, Hirotaka Tamura, and **Helmut G. Katzgraber**,  
“*Physics-Inspired Optimization for Quadratic Unconstrained Problems Using a Digital Annealer*,”  
Phys. Rev. E, submitted (arXiv:physics/1806.08815)
- 123 Mario S. Koenz, Guglielmo Mazzola, Andrew J. Ochoa, **Helmut G. Katzgraber** and Matthias Troyer,  
“*Uncertain Fate of Fair Sampling in Quantum Annealing*,”  
Phys. Rev. Lett., submitted (arXiv:quant-physics/1806.06081)
- 122 **Helmut G. Katzgraber** and M. A. Novotny,  
“*A small-world search for quantum speedup: How small-world interactions can lead to improved quantum annealer designs*,”  
Phys. Rev. Applied 10, 054004 (2018)
- 121 Andrew J. Ochoa, Darryl C. Jacob, Salvatore Mandra, and **Helmut G. Katzgraber**,  
“*Feeding the Multitude: A Polynomial-time Algorithm to Improve Sampling*,”  
submitted, (arXiv:cond-mat/1801.07681)
- 120 Chao Fang, Zheng Zhu, and **Helmut G. Katzgraber**,  
“*NAE-SAT-based probabilistic membership filters*,”  
arXiv:cs.DS/1801.06232
- 119 Wenlong Wang,\* M. A. Moore, and **Helmut G. Katzgraber**,  
“*Fractal dimension of interfaces in Edwards-Anderson spin glasses for up to six space dimensions*,”  
Phys. Rev. E 97, 032104 (2018)
- 118 Firas Hamze, Darryl C. Jacob, Andrew J. Ochoa, Dilina Perera,\* Wenlong Wang,\* and **Helmut G. Katzgraber**,  
“*From Near to Eternity: Spin-glass planting, tiling puzzles, and constraint satisfaction problems*,”  
Phys. Rev. E 97, 043303 (2018)
- 117 S. Mandrà and **Helmut G. Katzgraber**,  
“*A deceptive step towards quantum speedup detection*,”  
Quant. Sci. Technol. 3, 04LT01 (2018)
- 116 Amin Barzegar, Christopher Pattison, Wenlong Wang,\* and **Helmut G. Katzgraber**,  
“*Optimization of population annealing Monte Carlo for large-scale spin-glass simulations*,”  
Phys. Rev. E, submitted, (arXiv:cond-mat/1710.09025)
- 115 Wenlong Wang,\* Jonathan Machta, Humberto Munoz-Bauza, **Helmut G. Katzgraber**,  
“*Number of thermodynamic states in the three-dimensional Edwards-Anderson spin glass*,”  
Phys. Rev. B 96, 184417 (2017)
- 114 Jeffery C. Chancellor, Rebecca S. Blue, Keith A. Cengel, Serena M. Aunon, Kathleen H. Rubins, **Helmut G. Katzgraber**, and Ann R. Kennedy,  
“*Limitations in Predicting the Space Radiation Health Risk for Exploration Astronauts*,”  
Nature Microgravity 4, 8 (2018)
- 113 Alejandro Perdomo-Ortiz, Alexander Feldman, Asier Ozaeta, Sergei V. Isakov, Zheng Zhu,\* Bryan O’Gorman, **Helmut G. Katzgraber**, Alexander Diedrich, Hartmut Neven, Johan de Kleer, Brad Lackey, Rupak Biswas,  
“*On the readiness of quantum optimization machines for industrial applications*,”  
submitted, (arXiv:quant-physics/1708.09780)
- 112 **Helmut G. Katzgraber**,  
“*Viewing Vanilla Quantum Annealing Through Spin Glasses*,”  
Quantum Sci. Technol. 3, 030505 (2018)  
► invited perspective article on “*What would you do with 1000 qubits?*”

- 111 Hamed Karimi, Gili Rosenberg, **Helmut G. Katzgraber**,  
 “*Effective optimization using sample persistence: A case study on quantum annealers and various Monte Carlo optimization methods*,”  
 Phys. Rev. E 96, 043312 (2017)  
 ► graphics selected for the Phys. Rev. E Kaleidoscope (Nov. 2017)
- 110 Juan Carlos Andresen, **Helmut G. Katzgraber**, and Moshe Schechter,  
 “*Random-field-induced disordering mechanism in a disordered ferromagnet: Between the Imry-Ma and the standard disordering mechanism*,”  
 Phys. Rev. B 96, 214414 (2017)
- 109 Jeffery C. Chancellor, Stephen Guetersloh, Keith Cengel, John Ford, and **Helmut G. Katzgraber**,  
 “*Emulation of the space radiation environment for materials testing and radiobiological experiments*,”  
 Phys. Rev. Appl., submitted (arXiv:app-physics/1706.02727)
- 108 Wenlong Wang,\* Salvatore Mandrà, and **Helmut G. Katzgraber**,  
 “*Patch-planting spin-glass solution for benchmarking*,”  
 Phys. Rev. E 96, 023312 (2017)
- 107 Wenlong Wang,\* M. A. Moore, and **Helmut G. Katzgraber**,  
 “*The Fractal Dimension of Interfaces in Edwards-Anderson and Long-range Ising Spin Glasses: Determining the Applicability of Different Theoretical Descriptions*,”  
 Phys. Rev. Lett. 119, 100602 (2017)
- 106 S. Mandrà, **Helmut G. Katzgraber** and Creighton Thomas,  
 “*The pitfalls of planar spin-glass benchmarks: Raising the bar for quantum annealers (again)*,”  
 Quantum Sci. Technol. 2, 038501, (2017)  
 ► selected as one of 10 articles to be featured in a highlights collection for the journal’s first year of publication
- 105 R. Santana, Z. Zhu,\* and **Helmut G. Katzgraber**,  
 “*Evolutionary Approaches to Optimization Problems in Chimera Topologies*,”  
 Genetic and Evolutionary Computation Conference (GECCO-2016), ACM Press, p. 397-404 (2016)
- 104 S. Mandrà, Z. Zhu,\* and **Helmut G. Katzgraber**,  
 “*Exponentially-Biased Ground-State Sampling of Quantum Annealing Machines with Transverse-Field Driving Hamiltonians*,”  
 Phys. Rev. Lett. 118, 070502 (2017)
- 103 T. Aspelmeier, Wenlong Wang,\* M. A. Moore, and **Helmut G. Katzgraber**,  
 “*The interface free-energy exponent in the one-dimensional Ising spin glass with long-range interactions in both the droplet and broken replica symmetry regions*,”  
 Phys. Rev. E, 94, 022116 (2016)
- 102 Z. Zhu,\* Chao Fang and **Helmut G. Katzgraber**,  
 “*borealis - A generalized global update algorithm for Boolean optimization problems*,”  
 arXiv:physics.comp-ph/1605.09399  
 ► winner of the incomplete unweighted Max-SAT random track of the 2016 SAT competition (July 2016)
- 101 Kohji Nishimura, Hidetoshi Nishimori, Andrew J. Ochoa and **Helmut G. Katzgraber**,  
 “*Retrieving the ground state of spin glasses using thermal noise: Performance of quantum annealing at finite temperatures*,”  
 Phys. Rev. E 94, 032105 (2016)
- 100 Z. Zhu,\* Andrew J. Ochoa and **Helmut G. Katzgraber**,  
 “*Lack of a thermodynamic finite-temperature spin-glass phase in the two-dimensional randomly-coupled ferromagnet*,”  
 Phys. Rev. B 97, 174425 (2018)
- 99 S. Mandrà, Z. Zhu,\* W. Wang,\* A. Perdomo-Ortiz, **Helmut G. Katzgraber**,  
 “*Strengths and Weaknesses of Weak-Strong Cluster Problems: A Detailed Overview of State-of-the-art Classical Heuristics vs Quantum Approaches*,”  
 Phys. Rev. A 94, 022337 (2016)
- 98 Ruben S. Andrist,\* **Helmut G. Katzgraber**, H. Bombin, M. A. Martin-Delgado,  
 “*Error tolerance of topological codes with independent bit-flip and measurement errors*,”  
 Phys. Rev. A 94, 012318 (2016)



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- 97 Daniel M. Packwood, Helmut G. Katzgraber, and Winfried Teizer,  
“*Stochastic Boltzmann Equation for Magnetic Relaxation in High-Spin Molecules,*”  
Proc. R. Soc. A 472 20150699 (2016)
- 96 Wenlong Wang,\* Jonathan Machta, **Helmut G. Katzgraber,**  
“*Bond chaos in spin glasses revealed through thermal boundary conditions,*”  
Phys. Rev. B 93, 224414 (2016)
- 95 O. Melchert,\* **Helmut G. Katzgraber,** M. A. Novotny,  
“*Site and bond percolation thresholds in  $K_{n,n}$ -based lattices: Vulnerability of quantum annealers to random qubit and coupler failures on Chimera topologies,*”  
Phys. Rev. E 93, 042128 (2016)
- 94 T. Aspelmeyer, **Helmut G. Katzgraber,** Derek Larson, M. A. Moore, M. Wittmann, Joonhyun Yeo,  
“*Finite-size critical scaling in Ising spin glasses in the mean-field regime,*”  
Phys. Rev. E 93, 032123 (2016)
- 93 Wenlong Wang,\* Jonathan Machta, **Helmut G. Katzgraber,**  
“*Population Annealing: Theory and Application in Spin Glasses,*”  
Phys. Rev. E 92, 063307 (2015)
- 92 Wenlong Wang, Jonathan Machta, **Helmut G. Katzgraber,**  
“*Chaos in Spin Glasses Revealed Through Thermal Boundary Conditions,*”  
Phys. Rev. B 92, 094410 (2015)
- 91 Zheng Zhu, Andrew J. Ochoa, Stefan Schnabel, Firas Hamze and **Helmut G. Katzgraber,**  
“*Best-case performance of quantum annealers on native spin-glass benchmarks: How chaos can affect success probabilities,*” Phys. Rev. A 93, 012317 (2016)
- 90 **Helmut G. Katzgraber,** Firas Hamze, Zheng Zhu, Andrew J. Ochoa, and H. Munoz-Bauza,  
“*Seeking Quantum Speedup Through Spin Glasses: The Good, the Bad, and the Ugly,*”  
Phys. Rev. X 5, 031026 (2015)
- 89 Zheng Zhu, Andrew J. Ochoa, and **Helmut G. Katzgraber,**  
“*Efficient Cluster Algorithm for Spin Glasses in Any Space Dimension,*”  
Phys. Rev. Lett. 115, 077201 (2015)
- 88 M. Weigel, **Helmut G. Katzgraber,** J. Machta, F. Hamze and R. S. Andrist,  
“*Erratum: Glassy Chimeras Could Be Blind to Quantum Speedup. . . [Phys. Rev. X 4, 021008 (2014)]*”  
Phys. Rev. X 5, 019901 (2015)
- 87 Wenlong Wang, Jonathan Machta, **Helmut G. Katzgraber,**  
“*Comparing Monte Carlo methods for finding ground states of Ising spin glasses: population annealing, simulated annealing and parallel tempering,*”  
Phys. Rev. E 92, 013303 (2015)
- 86 R. Santana, R. B. McDonald, **H. G. Katzgraber,**  
“*A probabilistic evolutionary optimization approach to compute quasiparticle braids,*”  
Simulated Evolution and Learning, Lecture Notes in Computer Science 8886, 13 (2014)
- 85 M. Wittmann, B. Yucesoy, **Helmut G. Katzgraber,** J. Machta, A. P. Young,  
“*Low-temperature behavior of the statistics of the overlap distribution in Ising spin-glass models,*”  
Phys. Rev. B 90, 134419 (2014)
- 84 Wenlong Wang, Jonathan Machta, **Helmut G. Katzgraber,**  
“*Evidence against a mean field description of short-range spin glasses revealed through thermal boundary conditions,*”  
Phys. Rev. B 90, 184412 (2014)
- 83 Juan Carlos Andresen,\* **Helmut G. Katzgraber,** Vadim Oganessian, and Moshe Schechter,  
“*Existence of a Thermodynamic Spin-Glass Phase in the Zero-Concentration Limit of Anisotropic Dipolar Systems,*”  
Phys. Rev. X 4, 041016 (2014)
- 82 Ruben S. Andrist, James R. Wootton, **Helmut G. Katzgraber,**  
“*Error Thresholds for Abelian Quantum Double Models: Increasing the bit-flip Stability of Topological Quantum Memory,*”  
Phys. Rev. A 91, 042331 (2015)

- 81 Arash Bellafard, Sudip Chakravarty, Matthias Troyer and **Helmut G. Katzgraber**,  
“*The effect of quenched bond disorder on first-order phase transitions,*”  
Annals Of Physics 357, 66 (2015)
- 80 M. A. Moore and **Helmut G. Katzgraber**,  
“*Dealing with correlated choices: How a spin glass model can help political parties select their policies,*”  
Phys. Rev. E 90, 042117 (2014)  
► graphics selected for the Phys. Rev. E Kaleidoscope (Oct. 2014)
- 79 **Helmut G. Katzgraber**, Firas Hamze, and Ruben S. Andrist,  
“*Glassy Chimeras could be blind to quantum speedup: Designing better benchmarks for quantum annealing machines,*”  
Phys. Rev. X 4, 021008 (2014)
- 78 Zheng Zhu, Juan Carlos Andresen, M. A. Moore and **Helmut G. Katzgraber**,  
“*Boolean decision problems with competing interactions on scale-free networks: Equilibrium and nonequilibrium behavior in an external bias,*”  
Phys. Rev. E 89, 022118 (2014)
- 77 Juan Carlos Andresen, Yohanes Pramudya, **Helmut G. Katzgraber**, Creighton K. Thomas,\* V. Dobrosavljevic and G. T. Zimanyi,  
“*Charge avalanches in the Coulomb glass: the role of long-range interactions,*”  
Phys. Rev. B 93, 094429 (2016)
- 76 Daniel M. Packwood, Kelley T. Reaves, Filippo L. Federici, Helmut G. Katzgraber, and Winfried Teizer,  
“*2D single molecule magnets with weak topological invariant magnetic moments: Mathematical prediction of targets for chemical synthesis,*”  
Proc. R. Soc. A 469, 20130373 (2013)
- 75 B. Yucesoy, **Helmut G. Katzgraber**, J. Machta,  
“*Reply to Comment on Evidence of non-mean-field-like low-temperature behavior in the Edwards-Anderson spin-glass model,*”  
Phys. Rev. Lett. 110, 219702 (2013)
- 74 Björn Ahrens,\* Jianping Xiao, Alexander K. Hartmann, and Helmut G. Katzgraber,  
“*Diluted antiferromagnets in a field seem to be in a different universality class than the random-field Ising model,*”  
Phys. Rev. B 88, 174408 (2013)
- 73 Ross B. McDonald and **Helmut G. Katzgraber**,  
“*Genetic Braid Optimization: A heuristic approach to compute quasiparticle braids,*”  
Phys. Rev. B 87, 054414 (2013)
- 72 Derek Larson, **Helmut G. Katzgraber**, M. A. Moore and A. P. Young,  
“*Spin glasses in a field: Three and four dimensions as seen from one space dimension,*”  
Phys. Rev. B 87, 024414 (2013)
- 71 Kelley Reaves, Kyongwan Kim, Katsuya Iwaya, Taro Hitosugi, Hanhua Zhao, Kim R. Dunbar, **Helmut G. Katzgraber**, Winfried Teizer,  
“*STM Studies of Isolated Mn12-Ph Single Molecule Magnets,*”  
SPIN 03, 1350004 (2013)
- 70 B. Yucesoy, J. Machta, **Helmut G. Katzgraber**,  
“*Correlations between the dynamics of parallel tempering and the free-energy landscape in spin glasses,*”  
Phys. Rev. E 87, 012104 (2013)
- 69 Juan Carlos Andresen, Zheng Zhu, R. S. Andrist, **Helmut G. Katzgraber**, V. Dobrosavljevic and G. T. Zimanyi,  
“*Self-Organized Criticality in Glassy Spin Systems Requires a Diverging Number of Neighbors,*”  
Phys. Rev. Lett. 111, 097203 (2013)
- 68 Arash Bellafard, **Helmut G. Katzgraber**, Matthias Troyer, and Sudip Chakravarty,  
“*Bond disorder induced criticality of the three-color Ashkin-Teller model,*”  
Phys. Rev. Lett. 109, 155701 (2012)
- 67 B. Yucesoy, **Helmut G. Katzgraber**, J. Machta,  
“*Evidence of non-mean-field-like low-temperature behavior in the Edwards-Anderson spin-glass model,*”  
Phys. Rev. Lett. 109, 177204 (2012)  
► see feature by A. A. Middleton in the Journal Club of Condensed Matter (May 2013)

- 
- 66 **Helmut G. Katzgraber**, Thomas Jorg, Florent Krzakala, Alexander K. Hartmann,  
“*Ultrametric probe of the spin-glass state in a field,*”  
Phys. Rev. B 86, 184405 (2012)
- 65 Juan Carlos Andresen, Creighton K. Thomas,\* **Helmut G. Katzgraber** and Moshe Schechter,  
“*Novel disordering mechanism in ferromagnetic systems with competing interactions,*”  
Phys. Rev. Lett. 111, 177202 (2013)
- 64 Ruben S. Andrist, H. Bombin, **Helmut G. Katzgraber** and M. A. Martin-Delgado,  
“*Optimal Error Correction in Topological Subsystem Codes,*”  
Phys. Rev. A 85, 050302(R) (2012)
- 63 H. Bombin, Ruben S. Andrist, Masayuki Ohzeki, **Helmut G. Katzgraber** and M. A. Martin-Delgado,  
“*Strong Resilience of Topological Codes to Depolarization,*”  
Phys. Rev. X 2, 021004 (2012)  
► see Physics Viewpoint by D. Gottesman [Physics 5, 50 (2012)]
- 62 **Helmut G. Katzgraber**, Katharina Janzen and Creighton K. Thomas,\*  
“*Boolean decision problems with competing interactions on scale-free networks: Critical thermodynamics,*”  
Phys. Rev. E 86, 031116 (2012)
- 61 Creighton K. Thomas\* and **Helmut G. Katzgraber**,  
“*Sampling of the ground-state magnetization of d-dimensional p-body Ising models,*”  
Phys. Rev. B 84, 174404 (2011)
- 60 Creighton K. Thomas\* and **Helmut G. Katzgraber**,  
“*Simplest model to study reentrance in physical systems,*”  
Phys. Rev. E 84, 040101(R) (2011)
- 59 Juan Carlos Andresen, Katharina Janzen, **Helmut G. Katzgraber**,  
“*Critical behavior and universality in Levy spin glasses,*”  
Phys. Rev. B 83, 174427 (2011)
- 58 Creighton K. Thomas\* and **Helmut G. Katzgraber**,  
“*Optimizing glassy p-spin models,*”  
Phys. Rev. E 83, 046709 (2011)
- 57 Masayuki Ohzeki, Creighton K. Thomas,\* **Helmut G. Katzgraber**, H. Bombin, M. A. Martin-Delgado,  
“*Universality in phase boundary slopes for spin glasses on self dual lattices,*”  
J. Stat. Mech. P02004 (2011)
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- 53 **Helmut G. Katzgraber**, H. Bombin, Ruben S. Andrist and M.-A. Martin-Delgado,  
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- 51 **Helmut G. Katzgraber**, H. Bombin and M.-A. Martin-Delgado,  
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- 50 Y. Matsuda, H. Nishimori, and **Helmut G. Katzgraber**,  
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- 48 **Helmut G. Katzgraber**, **D. Larson** and A. P. Young,  
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- 47 **Helmut G. Katzgraber**, I. A. Campbell and A. K. Hartmann,  
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- 46 **Helmut G. Katzgraber** and A. K. Hartmann,  
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- 45 **K. Jäger**, **W. Lipinski**, **Helmut G. Katzgraber**, and A. Steinfeld,  
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- 44 **Brigitte Surer**, **Helmut G. Katzgraber**, G. T. Zimanyi, B. A. Allgood and G. Blatter,  
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- 41 T. Jörg and **Helmut G. Katzgraber**,  
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- 40 T. Jörg and **Helmut G. Katzgraber**,  
“*Universality and universal finite-size scaling functions in four-dimensional Ising spin glasses*,”  
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- 39 M. Pelikan, **Helmut G. Katzgraber**, and S. Kobe,  
“*Finding Ground States of Sherrington-Kirkpatrick Spin Glasses with Hierarchical BOA and Genetic Algorithms*,”  
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- 37 S. Boettcher, **Helmut G. Katzgraber**, and D. Sherrington,  
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“*Engineering exotic phases for topologically-protected quantum computation by emulating quantum dimer models*,”  
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- 35 **Charlotte Gils**, **Helmut G. Katzgraber**, and Matthias Troyer,  
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J. Stat. Mech. P09011 (2007)
- 34 **Helmut G. Katzgraber**, D. Hérisson, M. Östh, Per Nordblad, Atsuko Ito, and Hiroko Aruga Katori,  
“*Finite versus zero-temperature hysteretic behavior of spin glasses: Experiment and theory*,”  
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- 33 **Helmut G. Katzgraber**, D. Würtz, and G. Blatter,  
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- 32 **Helmut G. Katzgraber**, L. W. Lee, and I. A. Campbell,  
“*Effective critical behavior of the two-dimensional Ising spin glass with bimodal interactions,*”  
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- 31 **Helmut G. Katzgraber** and F. Krzakala,  
“*Temperature and Disorder Chaos in Three-Dimensional Ising Spin Glasses,*”  
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“*Critical behavior of the three- and ten-state short-range Potts glass: A Monte Carlo study,*”  
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“*Simulations of ultracold bosonic atoms in optical lattices with anharmonic traps,*”  
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J. E. Davies, Kai Liu, G. T. Zimanyi, **Helmut G. Katzgraber**, O. Hellwig, E. E. Fullerton, and J. B. Kortright,  
“*Disorder-induced magnetic memory: Experiments and theories,*”  
Phys. Rev. B 75, 144406 (2007)
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“*Probing tails of energy distributions using importance-sampling in the disorder with a guiding function,*”  
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- 26 **Helmut G. Katzgraber**, M. Körner and A. P. Young,  
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Phys. Rev. B 73, 224432 (2006)
- 25 **Helmut G. Katzgraber**, S. Trebst, D. A. Huse, and M. Troyer,  
“*Feedback-optimized parallel tempering Monte Carlo,*”  
J. Stat. Mech. P03018 (2006)
- 24 **Helmut G. Katzgraber**, L. W. Lee, and I. A. Campbell,  
“*Nontrivial critical behavior of the free energy in the two-dimensional Ising spin glass with bimodal interactions,*”  
(arXiv:cond-mat/0510668)
- 23 **Helmut G. Katzgraber**, A. Esposito, and M. Troyer,  
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Phys. Rev. A 74, 043602 (2006)
- 22 **Helmut G. Katzgraber** and G. T. Zimányi,  
“*Hysteretic memory effects in disordered magnets,*”  
Phys. Rev. B 74, 020405(R) (2006)
- 21 **Helmut G. Katzgraber** and A. P. Young,  
“*Probing the Almeida-Thouless line away from the mean-field model,*”  
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▶ see feature by J. P. Bouchaud in the Journal Club of Condensed Matter (Nov. 2005)
- 20 **Helmut G. Katzgraber**, M. Körner, F. Liers, M. Jünger and A. K. Hartmann,  
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Phys. Rev. B 72, 094421 (2005)
- 19 **Helmut G. Katzgraber** and I. A. Campbell,  
“*Dynamical scaling in Ising and vector spin glasses,*”  
Phys. Rev. B 72, 014462 (2005)
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  - 16 **A. P. Young** and **Helmut G. Katzgraber**,  
“Absence of an Almeida-Thouless line in Three-Dimensional Spin Glasses,”  
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  - 15 **I. A. Campbell**, **A. K. Hartmann**, and **Helmut G. Katzgraber**,  
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  - 14 **Helmut G. Katzgraber**, **L. W. Lee**, and **A. P. Young**,  
“Correlation length of the two-dimensional Ising spin glass with Gaussian interactions,”  
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  - 13 **Helmut G. Katzgraber** and **I. A. Campbell**,  
“Critical properties of the three- and four-dimensional gauge glass,”  
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  - 12 **Helmut G. Katzgraber** and **A. P. Young**,  
“Geometry of large-scale low-energy excitations in the one-dimensional Ising spin glass with power-law interactions,”  
Phys. Rev. B 68, 224408 (2003)
  - 11 **Helmut G. Katzgraber** and **I. A. Campbell**,  
“Size-dependence of the internal energy in Ising and vector spin glasses,”  
Phys. Rev. B 68, 180402(R) (2003)
  - 10 **Helmut G. Katzgraber**,  
“On the existence of a finite-temperature transition in the two-dimensional gauge glass,”  
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“Finding Low-Temperature States with Parallel Tempering, Simulated Annealing and Simple Monte Carlo,”  
Int. J. of Mod. Phys. C 14, Vol. 3, 285 (2003)
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“Numerical studies of the two- and three-dimensional gauge glass at low temperature,”  
Phys. Rev. B 66, 224507 (2002)
  - 6 **Helmut G. Katzgraber**, **F. Pázmándi**, **C. R. Pike**, **Kai Liu**, **R. T. Scalettar**, **K. L. Verosub**, and **G. T. Zimányi**,  
“Reversal-field memory in the Hysteresis of Spin Glasses,”  
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  - 5 **Helmut G. Katzgraber** and **A. P. Young**,  
“Monte Carlo simulations of spin glasses at low temperatures: Effects of free boundary conditions,”  
Phys. Rev. B 65, 214402 (2002)
  - 4 **Helmut G. Katzgraber** and **A. P. Young**,  
“Monte Carlo simulations of the four-dimensional XY spin glass at low temperatures,”  
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  - 3 **Helmut G. Katzgraber** and **A. P. Young**,  
“Nature of the spin-glass state in the three-dimensional gauge glass,”  
Phys. Rev. B 64, 104426 (2001)
  - 2 **Helmut G. Katzgraber**, **M. Palassini**, and **A. P. Young**,  
“Monte Carlo simulations of spin glasses at low temperatures,”  
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- 1 **Helmut G. Katzgraber**, H. P. Büchler, and G. Blatter, “Casimir force between vortex matter in anisotropic and layered superconductors,” Phys. Rev. B 59, 11990 (1999)

#### Book Chapters

- 4 **Helmut G. Katzgraber**, “Random Numbers in Scientific Computing: An Introduction,” lecture held at the second summer school “Modern Computation Science,” Eds. A. K. Hartmann and R. Leidl, BIS-Verlag Oldenburg, Germany (2010). See also arXiv:comp-ph/1005.4117
- 3 **Helmut G. Katzgraber**, “Introduction to Monte Carlo Methods,” lecture held at the summer school “Modern Computation Science,” Eds. A. K. Hartmann and R. Leidl, BIS-Verlag Oldenburg, Germany (2009). See also arXiv:cond-mat/0905.1629
- 2 **Helmut G. Katzgraber**, “Scientific Software Engineering in a Nutshell,” lecture held at the summer school “Modern Computation Science,” Eds. A. K. Hartmann and R. Leidl, BIS-Verlag Oldenburg, Germany (2009). See also arXiv:comp-ph/0905.1628
- 1 S. Trebst, D. A. Huse, E. Gull, **Helmut G. Katzgraber**, U. H. E. Hansmann, and M. Troyer, “Ensemble optimization techniques for the simulation of slowly equilibrating systems,” in “Computer Simulation Studies in Condensed Matter Physics XIX” Springer Proceedings in Physics, Volume 115, Eds. D. P. Landau, S. P. Lewis and H.-B. Schüttler, eds (2009)

#### Refereed Conference Proceedings

- 10 **Helmut G. Katzgraber** and Ruben S. Andrist,\* “Stability of topologically-protected quantum computing proposals as seen through spin glasses,” in Proceedings of the International Meeting on “Inference, Computation, and Spin Glasses,” Sapporo, Japan, J. Phys.: Conf. Ser. 473 012019 (2013)
- 9 **Helmut G. Katzgraber**, Alexander K. Hartmann, and A. P. Young, “New Insights from One-Dimensional Spin Glasses,” in Proceedings of the 21st Workshop, Computer Simulations Studies in Condensed Matter Physics XXI, Physics Procedia 6, 35 (2010)
- 8 Y. Matsuda, H. Nishimori, and **Helmut G. Katzgraber**, “Quantum annealing for problems with ground-state degeneracy,” in Proceedings of the International Workshop on Statistical-Mechanical Informatics 2008, Sendai (Japan) September 14–17, 2007, J. Phys.: Conf. Ser. 143, 012003 (2009)
- 7 **Helmut G. Katzgraber**, “Spin glasses and algorithm benchmarks: A one-dimensional view,” in Proceedings of the International Workshop on Statistical-Mechanical Informatics 2007, Kyoto (Japan) September 16–19, 2007, J. Phys.: Conf. Ser. 95, 012004 (2008)
- 6 **Helmut G. Katzgraber**, M. Körner, F. Liers, and A. K. Hartmann, “Overcoming system-size limitations in spin glasses,” Proceedings of the 2004 SPDSA Conference in Hayama, Japan, July 12 – 15, 2004, Progress of Theoretical Physics Supp. No. 157, 59 (2005)
- 5 **Helmut G. Katzgraber**, G. Friedman, and G. T. Zimányi, “Fingerprinting hysteresis,” Proceedings of the 2003 HMM Conference, Salamanca, Spain, May 2003, Physica B 343, 10 (2004)
- 4 **Helmut G. Katzgraber**, F. Pázmándi, C. R. Pike, Kai Liu, R. T. Scalettar, K. L. Verosub, and G. T. Zimányi, “Reversal-field memory in magnetic hysteresis,” Proceedings of the 2002 MMM Conference, Tampa, FL, Nov 11 – 15, 2002, J. Appl. Phys. 93, 6617 (2003)
- 3 **Helmut G. Katzgraber**, “Numerical studies of the two- and three-dimensional gauge glass at low temperature,” Proceedings of the 2002 MMM Conference, Tampa, FL, Nov 11 – 15, 2002, J. Appl. Phys. 93, 7661 (2003)
- 2 **Helmut G. Katzgraber**, “Monte Carlo simulations of vector spin glasses at low temperatures,” Proceedings of “Computational Modeling and Simulation of Complex Systems” Conference, Aachen, Germany, September 5 – 8, 2001, Comp. Phys. Comm. 147, 439 (2002)
- 1 H. P. Büchler, **Helmut G. Katzgraber**, and G. Blatter, “Casimir force between two half spaces of vortex matter in anisotropic superconductors,” Proceedings of the First Euro Conference on “Vortex Matter in Superconductors,” Crete, Greece, September 18 – 24, 1999, Physica C 332, Issue 1–4 (2000)

#### Theses

- 2 **Helmut G. Katzgraber**, “*Nature of the spin-glass state as seen from low-temperature Monte Carlo simulations*,” Ph.D. Thesis, University of California Santa Cruz, CA (2001)
- 1 **Helmut G. Katzgraber**, “*Attraction of Vortices in Anisotropic and Layered Superconductors*,” Diploma Thesis (masters equivalent), ETH Zürich, Switzerland (1997)



## TEACHING

**Graduate Lectures**

Graduate Lecture “Computational Physics,” (PHYS 619, 2+3h/week) Texas A&M (Spring 2018)  
 Graduate Lecture “Computational Physics,” (PHYS 619, 2+3h/week) Texas A&M (Spring 2015)  
 Graduate Lecture “Computational Physics,” (PHYS 619, 2+3h/week) Texas A&M (Spring 2014)  
 Graduate Seminar “Introduction to Research,” (PHYS 681, 1h/week) Texas A&M (Spring 2011)  
 Graduate Seminar “Introduction to Research,” (PHYS 681, 1h/week) Texas A&M (Fall 2010)  
 Graduate Seminar (organizer) “Quantum Computing,” (3h/week) ETH Zürich (Spring 2008)  
 Graduate Lecture “Optimization Algorithms in Physics,” (2h/week) ETH Zürich (Fall 2007)  
 Graduate Seminar (organizer) “Phase Transitions,” (3h/week) ETH Zürich (Spring 2007)

**Undergraduate Lectures**

Undergraduate Lecture “Computational Physics,” (PHYS 401, 2+3h/week) Texas A&M (Spring 2015)  
 Undergraduate Lecture “Computational Physics,” (PHYS 401, 2+3h/week) Texas A&M (Spring 2014)  
 Undergraduate Lecture “College Physics,” (PHYS 202, 2x3h/week) Texas A&M (Fall 2012)  
 Undergraduate Lecture “College Physics,” (PHYS 202, 2x3h/week) Texas A&M (Fall 2011)  
 Undergraduate Lecture “College Physics,” (PHYS 202, 2x3h/week) Texas A&M (Fall 2010)  
 Undergraduate Lecture “College Physics,” (PHYS 202, 2x3h/week) Texas A&M (Fall 2009)  
 Undergraduate Lecture “College Physics,” (PHYS 202, 3h/week) Texas A&M (Spring 2009)

**New Courses Developed**

Undergraduate (PHYS 401) course+lab “Computational Physics” (2+3h/week)  
 Graduate (PHYS 619) course+lab “Computational Physics” (2+3h/week)  
 Graduate Lecture “Optimization Algorithms in Physics” (2h/week)  
 Graduate Short Course “Introduction to *Mathematica*” (2h)

**Short Courses**

Graduate Lecture “Introduction to Mathematica,” (2h course) ETH Zürich (2002 – 2006)  
 Graduate Case Study “Spin Glasses and Optimization Problems,” (2h course) ETH Zürich (2006)

**Lectures at International Schools**

DPG School (Computational Physics...), Bad Honnef (2015), “*First steps towards Monte Carlo*”  
 DPG School (Computational Physics...), Bad Honnef (2015), “*Advanced Monte Carlo & Spin Glasses*”  
 Comp. Phys. Mini Course, Ben Gurion Univ., Israel (2014), “*Optimization Methods in Physics*”  
 Comp. Phys. Mini Course, Ben Gurion Univ., Israel (2014), “*Introduction to Complexity Theory*”  
 Comp. Phys. Mini Course, Ben Gurion Univ., Israel (2014), “*Advanced Monte Carlo Methods*”  
 Comp. Phys. Mini Course, Ben Gurion Univ., Israel (2014), “*Introduction to Monte Carlo Methods*”  
 Comp. Phys. Mini Course, Ben Gurion Univ., Israel (2014), “*Monte Carlo Integration*”  
 Comp. Phys. Mini Course, Ben Gurion Univ., Israel (2014), “*Random Number Generation*”  
 Comp. Phys. Mini Course, Ben Gurion Univ., Israel (2014), “*Software Engineering in a Nutshell*”  
 Comp. Phys. Mini Course, Ben Gurion Univ., Israel (2014), “*Basics of Computer Hardware*”  
 DPG School (Efficient Algorithms...), Bad Honnef (2012), “*Introduction to Monte Carlo Methods*”  
 DPG School (Efficient Algorithms...), Bad Honnef (2012), “*Advanced Monte Carlo Methods*”  
 Quantum Information meets Stat. Mech., El Escorial (2011), “*Spin glasses and quantum computing*”  
 Modern Computational Science, Oldenburg (2009 – 2012), “*Random Numbers*”  
 Modern Computational Science, Oldenburg (2009 – 2012), “*Introduction to Monte Carlo Methods*”  
 Modern Computational Science, Oldenburg (2009 – 2012), “*Advanced Monte Carlo Methods*”  
 Modern Computational Science, Oldenburg (2009 – 2012), “*Software Engineering in a Nutshell*”  
 Monte Carlo Simulations of Disordered Systems, Leipzig (2008), “*Exchange Monte Carlo*”  
 Monte Carlo Simulations of Disordered Systems, Leipzig, (2008), “*New insights from 1D spin glasses*”

**Substitute Lecturer**

Graduate Course “Advanced Theoretical Condensed Matter Physics,” ETH Zürich (2002, 2005)  
 Graduate Course “Computational Physics,” ETH Zürich (2002, 2004, 2006)  
 Graduate Course “Advanced Computational Physics,” ETH Zürich (2006)

**Teaching Assistant**

Coordinator, Graduate Seminar “Topology in Physics,” ETH Zürich (2006)  
 Coordinator, Graduate Seminar “Methods in Condensed Matter Physics,” ETH Zürich (2004)  
 Assistant, Graduate Seminar “Monte Carlo Methods in Statistical Physics,” ETH Zürich (2004)  
 Coordinator, Graduate Seminar “Bose-Einstein Condensation,” ETH Zürich (2003)  
 Assistant, Graduate Course “Theoretical Condensed Matter Physics,” ETH Zürich (2002)

Assistant, Undergraduate Course “Advanced Mathematical Physics,” UC Santa Cruz (1998)  
 Assistant, Undergraduate Physics Lab, UC Santa Cruz (1997)  
 Assistant, Undergraduate Course “Calculus for Engineers,” ETH Zürich (1995 – 1997)

## TEACHING AWARDS

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### **Distinguished Achievement College-Level Award in Teaching**

Awarded by the the Texas A&M Association of Former Students (USD 2000, Fall 2013)

### **Teaching Excellence Award**

Awarded by the Texas A&M System (USD 4000, Fall 2009)

## SUPERVISION

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### **Post-Doctoral Scholars**

Dr. Creighton Thomas, Texas A&M (2009 – 2011)  
 Dr. Björn Ahrens, Texas A&M (2012)  
 Dr. Ruben Andrist, ETH Zürich (2012 – 2013)  
 Dr. Juan Carlos Andresen, ETH Zürich (2013)  
 Dr. Oliver Melchert, Texas A&M (2015)  
 Dr. Wenlong Wang, Texas A&M (2015 – 2017)  
 Dr. Zheng Zhu, Texas A&M (2015 – 2017)  
 Dr. Dilina Perera, Texas A&M (since 2017)  
 Dr. Katja Biswas, Texas A&M (since 2018)

### **Graduate Students – PhD track**

Juan Carlos Andresen, ETH Zürich (2009 – 2013, PhD 2013, Kreitman Fellow, Gustafsson Fellow)  
 Ruben Andrist, ETH Zürich (2008 – 2012, PhD 2012, recipient of the ETH Medal, SFI Omidyar Fellow)  
 Wanyok Atisattapong, visiting graduate student Texas A&M University (2009)  
 Amin Barzegar, Texas A&M University (since 2015)  
 Jefferey Chancellor, Texas A&M University (2015 – 2018, PhD 2018)  
 Chao Fang, Texas A&M University (since 2015)  
 Gregory Hodges, Texas A&M University (2011 – 2012)  
 Christopher Langlett, Texas A&M University (since 2018)  
 Richard Lawrence, Texas A&M University (2014 – 2015)  
 Ross McDonald, Texas A&M University (2010 – 2014)  
 Andrew Ochoa, Texas A&M University (2012 – 2017, PhD 2017)  
 Brigitte Surer, ETH Zürich (2007 – 2009)  
 Erin K. Vehstedt, Texas A&M University (2011 – 2012, with J. Sinova)  
 Jianping Xiao, Texas A&M University (2009 – 2011)  
 Zheng Zhu, Texas A&M University (2011 – 2015, PhD 2015)

### **Graduate Students – MS track**

A. Esposito, master thesis “Fermionic atoms in optical lattices,” ETH Zürich (2004)  
 O. Gygi, master thesis “Bosonic atoms in optical lattices,” ETH Zürich (2005)  
 B. Surer, master thesis “Numerical studies of electron glasses,” ETH Zürich (2007)  
 K. Jaeger, master thesis “Numerical study of chemical solar energy storage,” ETH Zürich (2007)  
 R. Andrist, master thesis “Long-range permutation Potts glass,” ETH Zürich (2008)  
 R. Affolter, master thesis “Radiative properties of thermoelectric materials,” ETH Zürich (2009)

### **Student Supervision and Advising**

H. P. Büchler, undergrad. project “Casimir force between vortex matter,” ETH Zürich (1998)  
 M. Körner, research project “Energy fluctuations in spin glasses,” ETH Zürich (2003)  
 L. W. Lee, research project “Correlation length of the 2D  $\pm J$  spin glass,” UC Santa Cruz (2004)  
 A. Esposito, class research project “Parallel tempering study of spin glasses,” ETH Zürich (2004)  
 F. Hassler, undergrad. research “Superconducting tetrahedral qubits,” ETH Zürich (2004)  
 P. Dayal, grad. research “Quantum 2D spin glasses,” ETH Zürich (2004)  
 T. Bisig, research project “Topologically protected qubits,” ETH Zürich (2004)  
 C. Gils, grad. research “Structural glass models,” ETH Zürich (2006)  
 D. Larson, grad. research “Optimizing parallel tempering in a field,” UC Santa Cruz (2006)  
 L. Bonnes, undergrad. research “Optimized parallel tempering,” ETH Zürich (2006)

- B. Surer, research project “Numerical studies of the Coulomb glass,” ETH Zürich (2006 – 2007)
- D. Murer, bachelor thesis “Striped phases in superconductors,” ETH Zürich (2007)
- R. Andrist, undergrad. research “Cluster algorithm for vector spin glasses,” ETH Zürich (2007)
- F. Gaignat, undergrad. research “Self-organized criticality in hysteresis,” ETH Zürich (2008)
- Y. Matsuda, grad. research “Quantum Annealing for degenerate systems,” ETH Zürich (2008)
- J. Xiao, graduate research “Numerical studies of the random-field Ising model,” Texas A&M (2009)
- W. Buck, undergraduate research (PHYS 491, 485) “Quantum random numbers,” Texas A&M (2010)
- R. Mai, undergraduate writing project (PHYS 491) “Superfluidity,” Texas A&M (2010)
- B. Yucesoy, graduate research project “Nature of the spin-glass state,” UMass Amherst (2011 – 2013)
- H. Munoz-Bauza, undergraduate research “Quantum Optimization,” Texas A&M (2014 – 2017)
- C. Pattison, undergraduate research “FPGA Programming,” Texas A&M (since 2016)
- D. C. Jacob, undergraduate research “Code Optimization,” Texas A&M (since 2017)
- I. Akpabio, undergraduate research “Machine Learning,” Texas A&M (since 2018)

**Thesis Committee Member**

- David Buzinski, PhD, Texas A&M Mathematics (Advisor: Michael Anshelevich)
- Sharath Chandra Mallojjala, PhD, Texas A&M Mathematics (Advisor: S. Wheeler)
- James J. Gerity, PhD, Texas A&M Physics & Astronomy (Advisor: P. McIntyre)
- Ilia Zintchenko, PhD, ETH Zürich (Advisor: M. Troyer, 2016)
- Wen Liu, PhD, Texas A&M Mathematics (Advisor: G. Berkolaiko, 2016)
- Esma Eryilmaz, PhD, Texas A&M Physics & Astronomy (Advisor: W. Teizer, 2015)
- Wenlong Wang, PhD, UMass Amherst Physics (Advisor: J. Machta, 2015)
- Kelley Reaves, MS, Texas A&M Physics & Astronomy (Advisor: W. Teizer, 2014)
- Elizabeth Sooby, PhD, Texas A&M Physics & Astronomy (Advisor: P. McIntyre, 2014)
- Kainan Wang, PhD, Texas A&M Mathematics (Advisor: W. Bangerth, 2014)
- Burcu Yucesoy, PhD, UMass Amherst Physics (Advisor: J. Machta, 2013)
- Dogan Kaya, MS, Texas A&M Physics & Astronomy (Advisor: I. Roshchin, 2012)
- Matthew Sears, PhD, Texas A&M Physics & Astronomy (Advisor: W. Saslow, 2011)

**Substitute Mathematics Teacher (High School level)**

- Kantonsschule (high school) Wattwil, Switzerland (1997)

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 INVITED TALKS
 

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**Industry Engagements**

- 01 Bank of America (Merrill Lynch) Investor Call (June 2018), “*The Quantum Landscape*”

**Conferences**

- 48 Many-body Dynamics and Quantum Systems Workshop, University of Strathclyde, Glasgow, UK (October 2018), “*Quantum-driven Classical Optimization*”
- 47 Quantum Computation and Information Workshop, Texas A&M University, College Station, TX (September 2018), “*Quantum-driven Classical Optimization*”
- 46 2018 XXX IUPAP Conference on Computational Physics, Davis, CA (July 2018), “*Quantum-driven Classical Optimization*”
- 45 Dynamics and Dissipation in Quantum Simulation Workshop, Stanford University, Palo Alto, CA (July 2018), “*Quantum-driven Classical Optimization*”
- 44 2018 Adiabatic Quantum Computing Conference, Mountain View, CA (June 2018), “*Quantum-driven Classical Optimization*”
- 43 Second International Workshop on Critical Behavior in Lattice Models, Anqing, China (April 2018), “*Quantum-driven Classical Optimization*”
- 42 Advances in Quantum Algorithms and Computation, Aspen Center for Physics, Aspen, CO (March 2018), “*Quantum-driven Classical Optimization*”
- 41 IARPA Quantum Enhanced Optimization Kickoff Meeting (October 2017), “*Test & Evaluation in QEO: Texas A&M’s Role*”
- 40 National Academies Committee on Technical Assessment of the Feasibility and Implications of Quantum Computing (July 2017), “*A perspective on quantum annealing*”
- 39 Microsoft Faculty Summit 2017: The Edge of AI (July 2017), “*Quantum vs classical optimization: A status update on the arms race*”
- 38 SIAM Conference on Optimization, Vancouver, BC (May 2017), “*Quantum vs classical optimization: A status update on the arms race*”
- 37 Global Derivatives, Trading & Risk Management Conference, Barcelona (May 2017), “*Quantum vs classical optimization: A status update on the arms race*”
- 36 IARPA Advanced Processor Developments session, IEEE International Conference on Rebooting Computing 2016, San Diego, CA (October 2016), “*Predicting quantum advantage and raising the bar for quantum architectures*”
- 35 Workshop on Theory and Practice of Adiabatic Quantum Computers and Quantum Simulation, ICTP Trieste (August 2016), “*Quantum vs classical optimization: A status update on the arms race*”
- 34 28th IUPAP Conference on Computational Physics – CCP 2016, Johannesburg, South Africa (July 2016), “*Quantum vs classical optimization: A status update on the arms race*”
- 33 Fifth Workshop in Adiabatic Quantum Computing – AQC 2016, Los Angeles, CA, USA (July 2016), “*Quantum vs classical optimization: A status update on the arms race*”
- 32 TNG Consulting Big Techday 9, Munich, Germany (June 2016), “*Quantum vs classical optimization: A status update on the arms race*”
- 31 International conference on quantum condensed matter, Engelberg, Switzerland (February 2016), “*Looking into the future through spin glasses: Benchmarking and design of quantum annealers*”
- 30 IARPA QEO Study Workshop, Seattle WA (January 2016), “*Engineered and tunable problems, benchmarking, testing & evaluation*”
- 29 Plenary talk, International Conference on Computer Simulation in Physics and beyond, Moscow, Russia (September 2015), “*Beyond Moore’s Law? Seeking Quantum Speedup Through Spin Glasses*”

- 28 New Horizons of Quantum and Classical Information, Tokyo, Japan (August 2015), “*Seeking Quantum Speedup Through Spin Glasses: The Good, the Bad, and the Ugly*”
- 27 March Meeting of the American Physical Society, San Antonio, TX (March 2015), “*Seeking Quantum Speedup Through Spin Glasses: Evidence of Tunneling?*”
- 26 Random magnets and quantum information (Honoring Peter Young), Santa Cruz, CA, USA (February 2015), “*Seeking Quantum Speedup Through Spin Glasses: The Good, the Bad, and the Ugly*”
- 25 Plenary talk, XXVI IUPAP Conference on Computational Physics – CCP2014, Boston, MA, USA (August 2014), “*Four decades of frustration in spin-glass physics: Advances and applications*”
- 24 Third Workshop in Adiabatic Quantum Computing – AQC 2014, Los Angeles, CA, USA (June 2014), “*Spin-glass-inspired benchmarks of quantum annealing machines*”
- 23 Texas A&M Supercomputing Annual User Meeting, Texas, USA (May 2014), “*Quantum Computers: Are we there yet?*”
- 22 Conference of the Middle European Cooperation in Statistical Physics (MECO 39), Coventry, UK (April 2014), “*Self-organized criticality in Hamiltonian spin systems: intriguingly ordinary or ordinarily intriguing?*”
- 21 Spring Meeting of the German Physical Society (DPG-Frühjahrstagung), Dresden, Germany (March 2014), “*Self-organized criticality in Hamiltonian spin systems: intriguingly ordinary or ordinarily intriguing?*”
- 20 Santa Fe Institute Workshop on Deep Computation in Statistical Physics, Santa Fe, NM (August 2013), “*Static and Dynamic Properties of Spin Glasses as seen through the Parallel Tempering Telescope*”
- 19 International Meeting on Inference, Computation, and Spin Glasses (ICSG2013), Sapporo, Japan (July 2013), “*Using the spin-glass machinery to determine the stability of topologically-protected quantum computing proposals*”
- 18 XXV IUPAP International Conference on Statistical Physics (StatPhys25), Seoul, Korea (July 2013), “*Four decades of frustration: Applications, algorithms and advances in spin-glass physics*”
- 17 March Meeting of the American Physical Society, Boston, MA (March 2012), “*Spin glasses: Still frustrating after all these years?*”
- 16 Asia Pacific Center for Theoretical Physics workshop on “Current Progress of Simulations in Complex Systems,” Pohang, Korea (November 2010), “*Gaining new physical insights using wacky spin-glass Hamiltonians*”
- 15 XVII Simposio Chileno de Fisica, Pucon, Chile (November 2010), “*Gaining new physical insights using wacky spin-glass Hamiltonians*”
- 14 Conference on “Out of Equilibrium Quantum Systems,” KITP Santa Barbara, CA (August 2010), “*Understanding the stability of topologically-protected quantum computing proposals using spin glasses*”
- 13 Seventh International Conference on Computational Physics, Beijing, China (May 2010), “*A one-dimensional approach to spin glasses*”
- 12 March Meeting of the American Physical Society, Portland, OR (March 2010), “*New insights from one-dimensional spin glasses*”
- 11 Recent Developments in Computer Simulation Studies in Condensed Matter Physics, Athens, GA USA (February 2008), “*New insights from one-dimensional spin glasses*”
- 10 Nonlinear Dynamics and Statistical Mechanics of Complex Systems Workshop, Lavin, Switzerland (January 2008), “*Spin glasses: Still frustrating after all these years?*”
- 9 Texas Section Meeting of the American Physical Society, College Station, TX (October 2007), “*The Physics of Diving*” (also held in Spanish)
- 8 Meeting of the Argentinian Physical Society, Salta, Argentina (September 2007), “*Do spin glasses order in a field?*”
- 7 International Workshop on Statistical-Mechanical Informatics, Kyoto, Japan (September 2007), “*Spin glasses and algorithm benchmarks: A one-dimensional view*”
- 6 ICREA Workshop “Disorder in Cold Atoms”, Barcelona, Spain (January 2007), “*Spin glasses and cold atoms*”
- 5 CECAM Workshop “Rugged Free Energy Landscapes in Glasses, Spin Glasses and Biological Macromolecules”, Lyon, France (June 2005), “*Overcoming system-size limitations in spin glasses*”



- 4 Beowulf Day, ETH Zürich, Switzerland (January 2005), “*Large-scale spin-glass simulations on the Hreidar Beowulf cluster*”
- 3 March Meeting of the American Physical Society, Montreal, Canada (March 2004), “*Overcoming system-size limitations in spin glasses*”
- 2 Dagstuhl-Seminar (New Optimization Algorithms in Physics), Dagstuhl, Germany (September 2003), “*Spin glasses at low and zero temperatures*”
- 1 Intl. Workshop on Magnetism, Hysteresis and the FORC Method, Davis CA (April 2003), “*Fingerprinting hysteretic systems: A numerical approach*”

### Summer Schools

- 34 DPG School on Physics (Computational Physics of Complex and Disordered Systems), Bad Honnef, Germany (September 2015), “*First steps towards Monte Carlo...*”
- 33 DPG School on Physics (Computational Physics of Complex and Disordered Systems), Bad Honnef, Germany (September 2015), “*Advanced Monte Carlo & Spin Glasses*”
- 32 Computational Physics Mini Course, Ben Gurion University, Israel (May 2014), “*Optimization Methods in Physics*”
- 31 Computational Physics Mini Course, Ben Gurion University, Israel (May 2014), “*Introduction to Complexity Theory*”
- 30 Computational Physics Mini Course, Ben Gurion University, Israel (May 2014), “*Advanced Monte Carlo Methods*”
- 29 Computational Physics Mini Course, Ben Gurion University, Israel (May 2014), “*Introduction to Monte Carlo Methods*”
- 28 Computational Physics Mini Course, Ben Gurion University, Israel (May 2014), “*Monte Carlo Integration*”
- 27 Computational Physics Mini Course, Ben Gurion University, Israel (May 2014), “*Random Number Generation*”
- 26 Computational Physics Mini Course, Ben Gurion University, Israel (May 2014), “*Software Engineering in a Nutshell*”
- 25 Computational Physics Mini Course, Ben Gurion University, Israel (May 2014), “*Basics of Computer Hardware*”
- 24 DPG School on Physics (Efficient Algorithms in Computational Physics), Bad Honnef, Germany (September 2012), “*Advanced Monte Carlo Methods*”
- 23 DPG School on Physics (Efficient Algorithms in Computational Physics), Bad Honnef, Germany (September 2012), “*Introduction to Monte Carlo Methods*”
- 22 Fourth summer school on Modern Computational Science, Oldenburg, Germany (August 2012), “*Random Numbers in Scientific Computing: An Introduction*”
- 21 Fourth summer school on Modern Computational Science, Oldenburg, Germany (August 2012), “*Advanced Monte Carlo Methods*”
- 20 Fourth summer school on Modern Computational Science, Oldenburg, Germany (August 2012), “*Introduction to Monte Carlo Methods*”
- 19 Fourth summer school on Modern Computational Science, Oldenburg, Germany (August 2012), “*Software Engineering in a Nutshell*”
- 18 High School Teachers Physics Enhancement Program, Mitchell Institute for Fundamental Physics, Cooks Branch, TX, USA (June 2012), “*Electrostatics*”
- 17 Summer School for Numerical Methods in Condensed Matter Physics, Taipei, Taiwan (September 2011), “*Advanced Monte Carlo Methods*”
- 16 Summer School for Numerical Methods in Condensed Matter Physics, Taipei, Taiwan (September 2011), “*Introduction to Monte Carlo Methods*”
- 15 Third summer school on Modern Computational Science, Oldenburg, Germany (August 2011), “*Random Numbers in Scientific Computing: An Introduction*”

- 14 Third summer school on Modern Computational Science, Oldenburg, Germany (August 2011), “*Advanced Monte Carlo Methods*”
- 13 Third summer school on Modern Computational Science, Oldenburg, Germany (August 2011), “*Introduction to Monte Carlo Methods*”
- 12 Third summer school on Modern Computational Science, Oldenburg, Germany (August 2011), “*Software Engineering in a Nutshell*”
- 11 Quantum Information meets Statistical Mechanics, El Escorial Summer School, Spain (July 2011), “*Using the spin-glass machinery to determine the stability of topologically-protected quantum computing proposals*”
- 10 Second summer school on Modern Computational Science, Oldenburg, Germany (August 2010), “*Random Numbers in Scientific Computing: An Introduction*”
- 9 Second summer school on Modern Computational Science, Oldenburg, Germany (August 2010), “*Advanced Monte Carlo Methods*”
- 8 Second summer school on Modern Computational Science, Oldenburg, Germany (August 2010), “*Introduction to Monte Carlo Methods*”
- 7 Second summer school on Modern Computational Science, Oldenburg, Germany (August 2010), “*Software Engineering in a Nutshell*”
- 6 Summer school on Modern Computational Science, Oldenburg, Germany (August 2009), “*Random Numbers*”
- 5 Summer school on Modern Computational Science, Oldenburg, Germany (August 2009), “*Advanced Monte Carlo Methods*”
- 4 Summer school on Modern Computational Science, Oldenburg, Germany (August 2009), “*Introduction to Monte Carlo Methods*”
- 3 Summer school on Modern Computational Science, Oldenburg, Germany (August 2009), “*Software Engineering in a Nutshell*”
- 2 Spring School on Monte Carlo Simulations of Disordered Systems, Leipzig, Germany (April 2008), “*Exchange Monte Carlo: an efficient workhorse for optimization problems*”
- 1 Spring School on Monte Carlo Simulations of Disordered Systems, Leipzig, Germany (April 2008), “*New insights from one-dimensional spin glasses*”

### Colloquia

- 23 Colloquium, University of Washington, Seattle, WA (October 2018), “*Quantum-driven Classical Optimization*”
- 22 Colloquium, Stanford University, Stanford, CA (January 2018), “*Quantum vs classical optimization: A status update on the arms race*”
- 21 Colloquium, University of New South Wales, Sydney, Australia (September 2016), “*Quantum vs classical optimization: A status update on the arms race*”
- 20 Colloquium, Syracuse University, Syracuse NY (April 2016), “*Beyond Moore’s Law? Seeking Quantum Speedup Through Spin Glasses*”
- 19 Colloquium, Swansea University, Swansea, UK (December 2015), “*Beyond Moore’s Law? Seeking Quantum Speedup Through Spin Glasses*”
- 18 Colloquium, University of Southern California, Los Angeles, CA (November 2015), “*Beyond Moore’s Law? Seeking Quantum Speedup Through Spin Glasses*”
- 17 Colloquium, Boston University, Boston MA (November 2014), “*Seeking Quantum Speedup Through Spin Glasses: The Good, the Bad, and the Ugly*”
- 16 Colloquium, Texas A&M University, College Station, TX (October 2014), “*Seeking Quantum Speedup Through Spin Glasses: The Good, the Bad, and the Ugly*”
- 15 Colloquium, Ben-Gurion University, Israel (May 2014), “*Self-organized criticality in Hamiltonian spin systems: intriguingly ordinary or ordinarily intriguing?*”
- 14 Theory Colloquium, University of Konstanz, Konstanz, Germany (November 2013), “*Self-organized criticality in Hamiltonian spin systems: intriguingly ordinary or ordinarily intriguing?*”

- 13 CNLS Colloquium, Los Alamos National Laboratory, Los Alamos NM (October 2013), “*Self-organized criticality in Hamiltonian spin systems: intriguingly ordinary or ordinarily intriguing?*”
- 12 Colloquium, Physics Department, National Taiwan University, Taipei, Taiwan (March 2012), “*Frustrating frustrated problems*”
- 11 Colloquium, Physics and Astronomy Department, Texas A&M University, College Station TX, USA (November 2011), “*Frustrating frustrated problems*”
- 10 Colloquium, Physics Department, Sam Houston State University, Huntsville TX, USA (November 2011), “*Frustrating frustrated magnets*”
- 9 Colloquium, Physics Department, Emory University, Atlanta GA, USA (April 2011), “*Do spin glasses order in a field? And why we should care . . .*”
- 8 Inaugural lecture, ETH Zurich, Zurich, Switzerland (May 2008), “*Glasses: the unknown known*”
- 7 Theory Colloquium, Department of Physics, Oldenburg University, Germany (January 2008), “*Spin glasses: Chaotic and universal*”
- 6 Colloquium, Department of Physics, Hong Kong Baptist University, Hong Kong (September 2007), “*Do spin glasses order in a field?*”
- 5 Colloquium, Department of Physics, Texas A&M University, College Station TX, USA (June 2007), “*Do spin glasses order in a field?*”
- 4 Colloquium, Department of Physics, University of Denver, Denver CO, USA (March 2007), “*Do spin glasses order in a field?*”
- 3 Colloquium, Department of Physics, Virginia Tech, Blacksburg VA, USA (March 2006), “*Do spin glasses order in a field?*”
- 2 Theory Colloquium, Innsbruck University, Innsbruck, Austria (October 2004), “*Spin glasses: still frustrating after all these years?*”
- 1 Colloquium, Institute for Informatics, University of Cologne, Cologne, Germany (June 2004), “*Spin glasses: still frustrating after all these years?*”

#### **Invited Seminars**

- 74 Computer Engineering and Systems Group Seminar, Texas A&M University, College Station, TX (November 2018), “*Quantum-driven classical optimization*”
- 73 Center for Nonlinear Studies, Los Alamos National Lab, Los Alamos, NM (August 2018), “*Quantum-driven classical optimization*”
- 72 Microsoft Research, Redmond, WA (February 2018), “*Quantum-driven classical optimization*”
- 71 Quantum Enhanced Optimization Weekly Meeting (January 2018), “*Test & Evaluation in QEO: Texas A&M’s Role*”
- 70 Applied Research Laboratory, University of Texas, Austin, TX (September 2017), “*Quantum vs classical optimization: A status update on the arms race*”
- 69 Texas A&M University, College Station, TX (September 2017), “*Quantum vs classical optimization: A status update on the arms race*”
- 68 University of Barcelona, Barcelona, Spain (May 2017), “*Quantum vs classical optimization: A status update on the arms race*”
- 67 101 Student Seminar, Texas A&M University, College Station, TX (October 2016), “*Computational Physics @ Texas A&M What is it all about?*”
- 66 1Qubit, Vancouver, Canada (October 2016), “*Quantum vs classical optimization: A status update on the arms race*”
- 65 Computational & Data Sciences Lecture Series, Texas A&M University, College Station TX, USA (September 2016), “*Quantum vs classical optimization: A status update on the arms race*”
- 64 University College London, London, UK (February 2016), “*Beyond Moore’s Law? Seeking Quantum Speedup Through Spin Glasses*”



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- 63 Tokyo Institute of Technology, Tokyo, Japan (January 2016), “*Beyond Moore’s Law? Seeking Quantum Speedup Through Spin Glasses*”
  - 62 Washington University, St. Louis, MO (October 2015), “*Beyond Moore’s Law? Seeking Quantum Speedup Through Spin Glasses*”
  - 61 Coventry University, Coventry, UK (September 2015), “*Beyond Moore’s Law? Seeking Quantum Speedup Through Spin Glasses*”
  - 60 University of Melbourne, Melbourne, Australia (June 2015), “*Seeking Quantum Speedup Through Spin Glasses: The Good, the Bad, and the Ugly*”
  - 59 Stromlo Observatory, ANU, Canberra, Australia (June 2015), “*Beyond Moore’s Law: Seeking Quantum Speedup Through Spin Glasses*”
  - 58 Australian National University, Canberra, Australia (June 2015), “*Seeking Quantum Speedup Through Spin Glasses: The Good, the Bad, and the Ugly*”
  - 57 D-Wave Inc., Burnaby, British Columbia Canada (September 2014), “*Playing with D-Wave Two... & Learning from spin-glass physics*”
  - 56 LA-SIGMA Seminar Series, Louisiana State University, Baton Rouge, LA (September 2014), “*Quantum Computers: Are we there yet?*”
  - 55 Ben-Gurion University, Israel (May 2014), “*Quantum Computers: Are we there yet?*”
  - 54 Applied Mathematics Undergraduate Seminar, Texas A&M University, College Station, TX (April 2014), “*Gambling for Science: Random Numbers in Scientific Computing*”
  - 53 Santa Fe Institute, Santa Fe NM (December 2013), “*Self-organized criticality in Hamiltonian spin systems: intriguingly ordinary or ordinarily intriguing?*”
  - 52 University of California, Santa Cruz CA (November 2013), “*Self-organized criticality in Hamiltonian spin systems: intriguingly ordinary or ordinarily intriguing?*”
  - 51 University of California, Davis CA (November 2013), “*Self-organized criticality in Hamiltonian spin systems: intriguingly ordinary or ordinarily intriguing?*”
  - 50 Universidad Complutense de Madrid, Spain (November 2013), “*Building better quantum computers using spin glasses*”
  - 49 Material Science & Engineering Program, Texas A&M University, College Station TX (October 2013), “*Frustrating frustrated problems*”
  - 48 Ben-Gurion University, Israel (May 2013), “*Boolean decision problems with competing interactions on scale-free networks*”
  - 47 Santa Fe Institute, Santa Fe NM (June 2012), “*Boolean decision problems with competing interactions on scale-free networks*”
  - 46 Institute of Physics, Chinese Academy of Sciences, Beijing, China (April 2012), “*Frustrating frustrated problems*”
  - 45 Physics Department, Renmin University, Beijing, China (April 2012), “*Frustrating frustrated problems*”
  - 44 Probability Seminar, Courant Institute of Mathematical Sciences, NYU, New York (September 2011), “*Universality in (Levy) spin glasses*”
  - 43 Microsoft Station Q, Santa Barbara, CA (June 2011), “*Understanding the stability of topologically-protected quantum computing proposals using spin glasses*”
  - 42 Texas A&M University, College Station, TX (April 2011), “*Spin glasses on scale-free networks: simple models to study opinion formation?*”
  - 41 Johannes-Gutenberg-University Mainz, Germany (January 2011), “*Do spin glasses order in a field?*”
  - 40 Ruprecht-Karls-University Heidelberg (January 2011), “*Do spin glasses order in a field?*”
  - 39 National High Magnetic Field Laboratory, Tallahassee FL (April 2010), “*Do spin glasses order in a field?*”
  - 38 City University of New York Graduate Center, New York NY (April 2010), “*Do spin glasses order in a field?*”
  - 37 University of Massachusetts, Amherst MA (April 2010), “*Do spin glasses order in a field?*”

- 36 Ben-Gurion University, Israel (February 2010), “*Do spin glasses order in a field?*”
- 35 Paul Scherrer Institute (PSI), Villigen, Switzerland (August 2009), “*Do spin glasses order in a field?*”
- 34 Syracuse University, Syracuse NY (January 2009), “*Do spin glasses order in a field?*”
- 33 Universidad Complutense de Madrid, Spain (July 2008), “*New insights from one-dimensional spin glasses*”
- 32 Louisiana State University, Baton Rouge LA (April 2007), “*Do spin glasses order in a field?*”
- 31 University of Barcelona, Barcelona, Spain (January 2007), “*Equilibrium and non-equilibrium properties of spin glasses in a field*”
- 30 ETH Zürich (QSIT seminar), Zürich, Switzerland (October 2006), “*Introduction to topologically protected quantum computing*”
- 29 University of California, Santa Cruz CA (October 2006), “*Ramping fermions in optical lattices across a Feshbach resonance*”
- 28 Department of Physics, Virginia Tech, Blacksburg VA, USA (August 2006), “*Ramping fermions in optical lattices across a Feshbach resonance*”
- 27 Department of Engineering Sciences and Physics, College of Staten Island CUNY, Staten Island NY (March 2006), “*Do spin glasses order in a field?*”
- 26 University of Göttingen, Germany (January 2006), “*Equilibrium and nonequilibrium properties of spin glasses in a field*”
- 25 EPF Lausanne, Switzerland (December 2005), “*Do spin glasses have a phase transition in a field?*”
- 24 University of California, Santa Cruz CA (November 2005), “*Equilibrium and non-equilibrium properties of spin glasses in a field*”
- 23 Utrecht University, Utrecht, The Netherlands (May 2005), “*Spin glasses: still frustrating after all these years?*”
- 22 University of California, Davis CA (March 2005), “*Equilibrium and non-equilibrium properties of spin glasses in a field*”
- 21 Microsoft Research Labs, Redmond, USA (February 2005), “*Spin glasses: still frustrating after all these years?*”
- 20 Royal Institute of Technology (KTH), Stockholm, Sweden (September 2004), “*Recent developments in spin glasses*”
- 19 Uppsala University, Uppsala, Sweden (September 2004), “*Equilibrium and non-equilibrium properties of spin glasses in a field*”
- 18 ISSP, The University of Tokyo, Kashiwa, Japan (July 2004), “*Recent developments in spin glasses*”
- 17 University of Osaka, Osaka, Japan (July 2004), “*Recent developments in spin glasses*”
- 16 The University of Electro-Communications, Tokyo, Japan (July 2004), “*Typical versus average superfluid density: Understanding the vortex glass phase*”
- 15 ETH Zürich, Switzerland (June 2004), “*Spin glasses: still frustrating after all these years?*”
- 14 University of California, Davis CA (May 2004), “*Typical versus average superfluid density: Understanding the vortex glass phase*”
- 13 University of California, Santa Cruz CA (May 2004), “*Typical versus average superfluid density: Understanding the vortex glass phase*”
- 12 ETH Zürich, Switzerland (April 2004), “*Spin glasses: still frustrating after all these years?*”
- 11 University of Arizona, Tucson AZ (December 2003), “*Overcoming system-size limitations in spin glasses*”
- 10 University of Montpellier, France (July 2003), “*Probing the nature of the spin-glass state with Monte Carlo simulations*”
- 9 University of California, Davis CA (April 2003), “*Probing the nature of the spin-glass state with Monte Carlo simulations*”
- 8 University of Göttingen, Germany (January 2003), “*The nature of the spin-glass state*”

- 7 University of Fribourg, Switzerland (November 2002), “*Probing the nature of the spin-glass state with Monte Carlo simulations*”
- 6 University of California, Santa Cruz CA (May 2002), “*FORC Diagrams and Reversal-Field Memory in Magnetic Hysteresis*”
- 5 Institute for Rock Magnetism, Minneapolis MN (May 2002), “*FORC diagrams and singularities in magnetic materials*”
- 4 ETH Zürich, Switzerland (September 2001), “*Nature of the Spin-Glass State as seen from Low-Temperature Monte Carlo Simulation*”
- 3 University of Basel, Switzerland (September 2001), “*Nature of the Spin-Glass State as seen from Low-Temperature Monte Carlo Simulations*”
- 2 University of California, Santa Cruz CA (October 2000), “*Monte Carlo Simulations of Spin-Glasses at Low Temperatures*”
- 1 University of California, Santa Cruz CA (February 1998), “*Van der Waals interaction of vortices in anisotropic and layered superconductors*”

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## CONFERENCE CONTRIBUTIONS

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### Talks

- 46 March Meeting of the American Physical Society, Los Angeles, CA (March 2018), “*Feeding the multitude: A polynomial-time algorithm to improve sampling of degenerate optimization problems*”
- 45 March Meeting of the American Physical Society, Los Angeles, CA (March 2018), “*Random-field-induced disordering mechanism in a disordered ferromagnet: Between the Imry-Ma and the standard disordering mechanism*”
- 44 Sixth Workshop in Adiabatic Quantum Computing – AQC 2017, Tokyo, Japan (July 2017), “*Test & Evaluation in Quantum Annealing: Raising the bar for novel architectures*”
- 43 March Meeting of the American Physical Society, New Orleans, LA (March 2017), “*Inducing mean-field criticality in spin glasses on quasi-planar topologies: Improved quantum annealer designs*”
- 42 Advances in Quantum Algorithms and Computation, Aspen Center for Physics, Aspen, CO (March 2016), “*Strengths and Weaknesses of Weak-Strong Cluster Problems*”
- 41 March Meeting of the American Physical Society, Baltimore, MD (March 2016), “*Can we predict the typical difficulty of optimization problems without solving them?*”
- 40 Conference of the Middle European Cooperation in Statistical Physics (MECO 41), Vienna, Austria (February 2016), “*Can we predict the difficulty of optimization problems without solving them?*”
- 39 Fourth Workshop in Adiabatic Quantum Computing – QEO Introduction, Zurich, Switzerland (June 2015), “*Engineered Instances, Optimization Problems & Classical Algorithms*”
- 38 Fourth Workshop in Adiabatic Quantum Computing – AQC 2015, Zurich, Switzerland (June 2015), “*Using insights from spin-glass physics to develop hard benchmarks for quantum annealers*”
- 37 ASCR Workshop on Quantum Computing for Science, Bethesda, MD, USA (February 2015), “*Seeking Quantum Speedup Through Spin Glasses: Learning from Statistical Physics*”
- 36 March Meeting of the American Physical Society, Baltimore, MD (March 2013), “*Are the diluted antiferromagnet in a field and the random-field Ising model in the same universality class?*”
- 35 March Meeting of the American Physical Society, Dallas, TX (March 2011), “*Spin glasses on scale-free networks: simple models to study opinion formation*”
- 34 StatPhys 24, Cairns Australia (July 2010), “*Using Monte Carlo simulations, topology and statistical mechanics to build stable quantum computers*”
- 33 March Meeting of the American Physical Society, Portland, OR, (March 2010), “*Error threshold for topological color codes on Union Jack lattices*”
- 32 March Meeting of the American Physical Society, Pittsburgh, PA (March 2009), “*Study of the de Almeida-Thouless line using power-law diluted one-dimensional Ising spin glasses*”

- 31 March Meeting of the American Physical Society, Pittsburgh, PA (March 2009), “*Error threshold in topological quantum-computing models with color codes*”
- 30 March Meeting of the American Physical Society, New Orleans, LA (March 2008), “*On the ordering of Ising spin glasses in a field*”
- 29 March Meeting of the American Physical Society, New Orleans, LA (March 2008), “*Monte Carlo study of the three-dimensional Coulomb glass*”
- 28 March Meeting of the American Physical Society, Denver, CO (March 2007), “*Universality in spin glasses: A Monte Carlo study*”
- 27 March Meeting of the American Physical Society, Denver, CO (March 2007), “*Chaos in spin glasses*”
- 26 Swiss Physical Society Meeting, Zurich, Switzerland (February 2007), “*Chaos in spin glasses*”
- 25 Monte Carlo data formats meeting, ETH Zürich, Switzerland (September 2006), “*Monte Carlo data formats for (spin) glass simulations*”
- 24 Highly Frustrated Magnetism Conference 2006, Osaka, Japan (August 2006), “*Do spin glasses order in a field?*”
- 23 March Meeting of the American Physical Society, Baltimore MD (March 2006), “*Ramping Fermions in Optical Lattices across a Feshbach resonance*”
- 22 March Meeting of the American Physical Society, Baltimore MD (March 2006), “*Probing the Almeida-Thouless line away from the mean-field model*”
- 21 Beowulf Day, ETH Zürich, Switzerland (January 2006), “*Do spin glasses have a phase transition in a field?*”
- 20 2005 Swiss Workshop in Materials with Novel Electronic Properties, Les Diablerets, Switzerland (September 2005), “*Ramping Fermions in Optical Lattices across a Feshbach resonance*”
- 19 Hysteresis and Magnetic Modeling Conference, Budapest, Hungary (May 2005), “*Memory effects in the hysteresis of the Edwards-Anderson Ising spin-glass model*”
- 18 March Meeting of the American Physical Society, Los Angeles CA (March 2005), “*Absence of an Almeida-Thouless line in Ising spin glasses*”
- 17 March Meeting of the American Physical Society, Los Angeles CA (March 2005), “*Correlation length of the two-dimensional Ising spin glass with bimodal interactions*”
- 16 Conference on Computational Physics, Genoa, Italy (September 2004), “*Feedback-optimized parallel tempering Monte Carlo*”
- 15 Conference on Statistical Physics of Disordered Systems and its Applications, Hayama, Japan (July 2004), “*Overcoming system-size limitations in spin glasses*”
- 14 March Meeting of the American Physical Society, Montreal, Canada (March 2004), “*Typical versus average superfluid density: Understanding the vortex glass phase*”
- 13 Beowulf Day, ETH Zürich, Switzerland (January 2004), “*Typical versus average superfluid density: Understanding the vortex glass phase*”
- 12 Hysteresis and Magnetic Modeling Conference, Salamanca, Spain (May 2003), “*Fingerprinting Hysteresis*”
- 11 Hysteresis and Magnetic Modeling Conference, Salamanca, Spain (May 2003), “*Fingerprinting Exchange Bias*” (together with K. Liu)
- 10 March Meeting of the American Physical Society, Austin TX (March 2003), “*Monte Carlo studies of the 1D Ising spin glass with power-law interactions*”
- 9 MaNEP Topical Meeting, Neuchatel, Switzerland (February 2003), “*Probing the nature of the spin-glass state with Monte Carlo simulations*”
- 8 Beowulf Day, ETH Zürich, Switzerland (January 2003), “*Nature of the spin-glass state*”
- 7 Conference on Magnetism and Magnetic Materials, Tampa FL (November 2002), “*Numerical studies of the two- and three-dimensional gauge glass at low temperature*”
- 6 March Meeting of the American Physical Society, Indianapolis IN (March 2002), “*FORC diagrams and singularities in magnetic materials*”

- 5 March Meeting of the American Physical Society, Indianapolis IN (March 2002), “*Spin-glasses at Low Temperatures: Effects of Free Boundary Conditions*”
- 4 March Meeting of the American Physical Society, Seattle WA (March 2001), “*Monte Carlo Simulations of Spin Glasses at Low Temperatures: The 3D Gauge Glass*”
- 3 CLC conference, Lake Tahoe CA (February 2001), “*Monte Carlo Simulations of Spin Glasses at Low Temperatures: The 3D Gauge Glass*”
- 2 PASI Conference Chile (January 2001), “*Monte Carlo Simulations of Spin Glasses at Low Temperatures*”
- 1 March Meeting of the American Physical Society, Los Angeles CA (March 1999), “*Casimir Force between Vortex Matter in Anisotropic and Layered Superconductors*”

#### Posters

- 8 International Conference on Magnetism 2006, Kyoto, Japan (August 2006), “*Probing the Almeida-Thouless line away from the mean-field model*”
- 7 Swiss Physical Society MaNEP Meeting, Lausanne, Switzerland (February 2006), “*Probing the Almeida-Thouless line away from the mean-field model*”
- 6 Conference on Statistical Physics of Disordered Systems and its Applications, Rome, Italy (September 2005), “*Probing the Almeida-Thouless line away from the mean-field model*”
- 5 MaNEP Topical Meeting (review panel), Neuchatel, Switzerland (June 2003), “*Large-scale low-energy excitations in the one-dimensional Ising spin glass with power-law interactions*”
- 4 Conference of the Middle European Cooperation in Statistical Physics (MECO 28), Saarbrücken, Germany (March 2003), “*Monte Carlo studies of the 1D Ising spin glass with power-law interactions*”
- 3 Conference on Magnetism and Magnetic Materials, Tampa FL (November 2002), “*Reversal-field memory in magnetic hysteresis*”
- 2 Conference on Computational Physics 2001, Aachen, Germany (September 2001), “*Monte Carlo Simulations of Vector Spin Glasses at Low Temperatures*”
- 1 4<sup>th</sup> International Workshop on Vortex Matter, Monte Verita, Switzerland (June 1997), “*Low Field Phase Diagram of Layered and Strongly Anisotropic Superconductors including Intervortex van der Waals Attractions*”

## SERVICE

**Service Awards**

2016 APS Outstanding Referee

**Grant Reviewing Activities**

National Science Foundation (NSF, USA), Department of Energy (DOE, USA), Department of Energy INCITE high-performance computing program (DOE, USA), Vannevar Bush Faculty Fellowship (Basic Research Office, Office of Assistant Secretary of Defense for Research and Engineering), Fondo Nacional de Desarrollo Científico y Tecnológico (FONDECYT, Chile), QIPC (Austria), Austrian Science Fund (FWF), Czech Science Foundation (Czech Republic), Croatian Science Foundation (Croatia), TAMU Qatar Seed Projects (Qatar)

**Journal Reviewing Activities**

Physical Review Letters, Physical Review X, Physical Review A, Physical Review B, Physical Review E, Physical Review Applied, International Journal of Modern Physics B, Journal of Magnetism and Magnetic Materials (JMMM), Journal of Physics – Condensed Matter (JPCM), Journal of the Physical Society of Japan (JPSJ), European Physics Journal B, IEEE Computing in Science and Engineering, IEEE Transactions on Magnetics, Indian Journal of Physics, Journal of Physics A, Journal of Physics D, Physica Scripta, New Journal of Physics, Computational Materials Science, PLOS ONE, Physica A, Physica B, Physica C, Frontiers in Physics, Journal of Computational Physics, Journal of Statistical Mechanics (JSTAT), Journal of Statistical Physics (JOSS), APS Physics, Europhysics Letters, Quantum Information & Computation, Quantum Information Processing, Quantum Science & Technology, Computer Physics Communications, Philosophical Magazine, Scipost.org, Nanotechnology, Nature, Nature Communications, Nature Physics, Nature Scientific Reports

**Book Reviewing Activities**

Cambridge University Press, World Scientific Publishing

**Editorial Board Member**

Physical Review X (ad hoc, since 2015)  
Nature Scientific Reports (2014 – 2016)  
SciPost.org member of the Editorial College (since 2016)

**Department-level Service**

Chair of the Texas A&M Physics & Astronomy awards committee (2012 – 2015)  
Chair of the Texas A&M Physics & Astronomy IT committee (2011 – 2015)  
Member of the Texas A&M Physics & Astronomy IT committee (2010 – 2011)  
Chair of the Texas A&M Physics & Astronomy Colloquium committee (2009 – 2011)  
Chair of the ETH Zürich Theoretical Physics Colloquium committee (2007 – 2008)  
Computer Coordinator of the UC Santa Cruz Physics Department (1999 – 2001)

**College-level Service**

Member of the Texas A&M College of Science IT committee (2015 – 2017)  
Member of the UC Santa Cruz Divisional Academic Computing Advisory Committee (2000)

**University-level Service**

Member of the Texas A&M University Grievance Committee (2017 – 2018)  
Member of the Texas A&M Supercomputing Steering Committee (2009 – 2015)  
Faculty advisor of the Texas A&M Student Anime Appreciation Club (2009 – 2011)  
Faculty advisor of the Texas A&M University Iaido Kyokai Club (2010 – 2012)  
Faculty advisor and instructor for the Texas A&M Shotokan Karate Club (2010 – 2013)  
Part-time instructor for the Texas A&M Shotokan Karate Club (2013 – 2014)

**Faculty Search Committees**

TAMU Physics and Astronomy – TAMU Qatar Science Program faculty search (2014)

**Conference Organization**

Organizer “*The inverse Ising problem and planted solutions*,” Santa Fe Institute, NM, 21–22/12/2015  
Co-organizer “*Meeting on Quantum Systems for Information Technology*,” Zürich, 21–24/03/2006  
Organizer, “*Physics–Visualization Meeting*,” Cooks Branch, 12/03/2011  
Co-organizer “*Classical and Quantum Optimization*,” Zürich, 20–22/08/2014

**Outreach**

Co-PI and co-producer for “*Inside a Scientist’s Suitcase*,” see <https://www.scientist-suitcase.org> (since 2017)



Demo design for the “*Physics Festival*” (“*The Physics of Diving*”), Texas A&M University (2009 – 2012)  
 Demo design for the “*Physics Festival*” (“*The Moses Effect*”), Texas A&M University (2012)  
 Presentation at “*Nacht der Physik*” (“*The Physics of Diving*”), ETH Zürich (2005)  
 Participation and experiment design in “*Physics for Kids and Teens*”, 150 Years ETH (2005)  
 Project reviewer at the ETH Maturandentag (2004, 2005)  
 Judge for the Santa Cruz County Science Fair (1998 – 2000)

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## PRESS RELEASES & NEWS FEATURES

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- Texas Advanced Computing Center featured research, “*Overcoming Quantum Error*,” 05/2011  
 Reprinted in the Texas A&M College of Science News  
 Reprinted in Supercomputing Online  
 Featured in HPC Wire  
 Featured in Slashdot
- Texas A&M College of Science News, “*Physicist H. Katzgraber Earns NSF CAREER Award*,” 03/2012  
 Featured in TAMU Science discover-e newsletter
- TAMU Times, “*National Awards Highlight Cutting-Edge Research From Texas A&M Junior Faculty*,” 05/2012
- The Eagle Newspaper, “*11 A&M profs awarded National Science Foundation grant*,” 05/2012
- Texas A&M College of Science News, “*College of Science Honors 2013 Award Winners*,” 10/2013
- TAMU Science discover-e newsletter, “*Extracurricular Excellence*,” 10/2013
- TAMU Battalion Newspaper, “*A&M Shotokan Club builds discipline, respect*,” 01/2013
- Texas A&M College of Science News, “*Texas A&M Physicist Says Stronger Benchmarks Needed to Fully Quantify Quantum Speedup*,” 01/2014  
 Reprinted in HPC Wire  
 Reprinted in the Santa Fe Institute News  
 Reprinted in Phys.org  
 Reprinted in National Science Foundation “*News From the Field*”  
 HPC Wire Soundbite interview (01/2014)
- PC World, “*D-Wave prepping quantum computers to outperform conventional servers*,” 03/2014  
 Reprinted in CIO Magazine  
 Reprinted in Tech World  
 Reprinted in Computerworld
- WIRED Magazine, “*The Age of Quantum Computing Has (Almost) Arrived*” (by C. Thompson), 06/2014
- Science Magazine, “*Quantum or not, controversial computer yields no speedup*” (by A. Cho), 06/2014
- Physics World, “*Is D-Wave’s quantum computer actually a quantum computer?*” (by H. Johnston), 06/2014
- Scientific American, “*Quantum Chaos: After a Failed Speed Test, the D-Wave Debate Continues*” (by S. Fletcher), 06/2014
- recode.net, “*D-Wave CEO: Our Next Quantum Processor Will Make Computer Science History*” (by J. Temple), 09/2014
- Santa Fe Institute Jan/Feb Update, “*Designing difficult problems*” (by S. Ornes), 01/2016
- Quanta Magazine, “*Computing’s Search for Quantum Questions*” (by S. Ornes), 06/2016  
 Highlighted in Quanta Magazine Podcast  
 Featured in TAMU Science discover-e newsletter
- Nature Podcast, “*Quantum Google*” (interview with Adam Levy), 06/2016  
 Featured in TAMU Science discover-e newsletter
- Texas A&M College of Science News, “*Texas A&M Physics Team Logs First-Place Finish in 2016 SAT Competition*,” 07/2016  
 Featured in TAMU Science discover-e newsletter
- IARPA Press Release, “*IARPA Launches ‘QEO’ Program To Develop Quantum Enhanced Computers*,” 04/2017  
 Reprinted and discussed in Quantum Computing Report

- KNet365 Finance, “*Quantum Computing: Practical Tools & Real World Applications*,” 05/2017
- Communication of the ACM (Association for Computing Machinery), “*Optimization Search Finds a Heart of Glass*” (interview with Chris Edwards), 06/2017
- Gizmodo, “*Mathematicians Reignite Thirty Year Old Debate About Glass With New Calculation*” (by R. F. Mandelbaum), 06/2017
- Texas A&M College of Science News, “*Texas A&M-Led Team Develops First Ground-Based Model Simulating Effects of Space Radiation*,” 06/2017  
Reprinted in the Texas A&M Today Campus News  
Featured in TAMU Science discover-e newsletter
- The Eagle Newspaper, “*Astronaut’s husband among Texas A&M researchers seeking solutions to space radiation issues*” (by S. Kuhlmann), 06/2017
- Gizmodo, “*Scientists Propose a New Way to Test How Space Radiation Will Fry You*” (by R. F. Mandelbaum), 06/2017
- Superposition.com, “*Diving into quantum computing with Helmut Katzgraber*” (by Whurley), 12/2017  
Featured in TAMU Science discover-e newsletter
- Superposition.com, “*Six Quantum Experts Share Their Christmas Wish Lists*” and “*Six Quantum Computing Experts Make Predictions for 2018*” (by Whurley), 12/2017
- Superposition.com, “*Since We Cannot Measure Departure or Arrival Times Without a Delay, There May be a Quantum Speed Limit*” (by Whurley), 01/2018
- Superposition.com, “*King Classical, Quantum Supremacy, and the Pursuit of Practical Applications*” (by Whurley), 02/2018
- Austin Business Journal “Whurley’s ‘strangest’ startup yet: Audacious entrepreneur launches new venture based on futuristic tech” (by M. Cronin)
- Texas Advanced Computing Center featured research, “*Anticipating the dangers of space*,” 04/2018  
Featured in HPC wire  
Featured in R&D Magazine  
Featured in Spaceflight News  
Picture of the day at Science 360 News
- Radio interview at the Peggy Smedley Show, “*Mechanics of Quantum Computing*” (live interview with Peggy Smedley), 04/2018
- Texas A&M College of Science News, “*Texas A&M Physics Graduate Student Jeff Chancellor Honored for Space Radiation Research*” 05/2018
- Gizmodo, “*New Quantum Computer Milestone Would Make Richard Feynman Very Happy*” (by R. F. Mandelbaum), 07/2018
- Physics World, “*Magnetic model simulated in 3D by D-Wave quantum processor*” (by T. Wogan), 07/2018
- ThirtyK.com, “*Why Blockchain Benefits From Better Random Numbers*” (by T. Williams), 07/2018

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## MISCELLANEA

### Professional Membership

Member of the American Physical Society (since 1996)

### Hobbies

Karate (1<sup>st</sup> Dan, black belt, 04/1999 – 09/2013)

Diving (PADI Divemaster No. 981564, since 09/2003)

Underwater photography (<https://katzgraber.org/scuba>, since 06/2004)

Running (since 07/2013)

Gelato (since 01/1973)

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Last updated on November 09, 2018