

# Curriculum Vitae

Seth A. Major

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## Education

- Ph.D., Physics, The Pennsylvania State University, 1997  
Advisor: Prof. Lee Smolin – Dissertation: *q-Quantum Gravity*
- M.S., Physics, Syracuse University, 1993  
Advisor: Prof. Lee Smolin
- B.A., Honors in Physics and Philosophy, Swarthmore College, 1991

## Academic Experience

- Professor* – Department of Physics, Hamilton College  
2012 - present
- Associate Professor* – Department of Physics, Hamilton College  
2006 - 2012
- Assistant Professor* – Department of Physics, Hamilton College  
2000 - 2006
- Short Term Visitor* – Perimeter Institute, Waterloo, Canada  
2002, 2009-2010
- Visiting Assistant Professor* – Department of Physics and Astronomy, Swarthmore College  
1999 - 2000
- Lise Meitner Fellow* – Institute for Theoretical Physics, University of Vienna, Austria  
1998-1999
- Teaching Fellow* – Deep Springs College  
1998,2000

## Publications

- \* J. Adelman, F. Hinterleitner, S. Major. “Quantum volume and length fluctuations in a midi-superspace model of Minkowski space” *Class. Quantum Grav.* **32** (2015) 055009 arXiv:1401.0327.
- F. Girelli, F. Hinterleitner, S. Major. “Loop Quantum Gravity Phenomenology: Linking Loops to Observational Physics” *SIGMA* **8** (2012) 098 arXiv:1210.1485.
- F. Hinterleitner and S. Major. “Toward Loop Quantization of Plane Gravitational Waves” *Class. Quantum Grav.* **29** (2012) 065019 arXiv:1106.1448.

- F. Hinterleitner and S. Major. “On plane gravitational waves in real connection variables” *Phys. Rev. D* **83** (2011) 044034 arXiv:1006.4146.
- S. Major. “Shape in an Atom of Space: Exploring quantum geometry phenomenology” *Class. Quantum Grav.* **27** (2010) 225012 arXiv:1005.5460.
- S. Major, D. Rideout, S. Surya. “Stable Homology as an Indicator of Manifoldlikeness in Causal Set Theory” *Class. Quantum Grav.* **26** (2009) 175008 arXiv:0902.0434.
- \* M. Gregg and S. Major. “On Modified Dispersion Relations and the Chandrasekhar Mass Limit” *Int. J. Mod. Phys. D* **18** (2009) 971-982 arXiv:0806.3496.
- S. Major. “On the  $q$ -Quantum Gravity Loop Algebra” *Class. Quantum Grav.* **25** (2008) 065003 arXiv:0708.0750.
- D. Craig, F. Dowker, J. Henson, S. Major, D. Rideout, R. Sorkin. “A Bell Inequality Analog in Quantum Measure Theory” *J. Phys. A: Math. Theor.* **40** (2007) 501-523 arXiv:quant-ph/0605008.
- S. Major, D. Rideout, S. Surya. “On Recovering Continuum Topology from a Causal Set” *J. Math. Phys.* **48** (2007) 032501 arXiv: gr-qc/0604124.
- S. Major, D. Rideout, S. Surya. “Spatial Hypersurfaces in Causal Set Cosmology” *Class. Quantum Grav.* **23** (2006) 4743-4751 arXiv: gr-qc/0506133.
- \* D. Heyman, F. Hinterleitner, and S. Major. “On reaction thresholds in doubly special relativity” *Phys. Rev. D* **69** (2004) 105016 arXiv: gr-qc/0312089.
- F. Hinterleitner and S. Major. “Isotropic Loop Quantum Cosmology with Matter II: The Lorentzian Constraint” *Phys. Rev. D* **68** (2003) 124023 arXiv: gr-qc/0309035.
- \* T. Konopka and S. Major. “Observational Limits on Quantum Geometry Effects” *New J. Phys.* **4** (2002) 57 arXiv: hep-ph/0201184.
- \* S. Major and M. Seifert. “Modeling Space with an Atom of Quantum Geometry” *Class. Quant. Grav.* **19** (2002) 2211-2227 arXiv: gr-qc/0109056.
- \* S. Major and K. Setter. “On the Universality of the Entropy-Area Relation” *Class. Quant. Grav.* **18** (2001) 5293-5298 arXiv: gr-qc/0108034.
- \* S. Major and K. Setter. “Gravitational Statistical Mechanics: A model” *Class. Quant. Grav.* **18** (2001) 5125-5141 arXiv: gr-qc/0101031.
- S. Major. “Quasilocal Energy for Spin-net Gravity” *Class. Quant. Grav.* **17** (2000) 1467-1487 arXiv: gr-qc/9906052.
- S. Major. “A Spin Network Primer” *Am. J. Phys.* **67** (1999) 972-980 arXiv: gr-qc/9905020.
- S. Major. “Operators for Quantized Directions” *Class. Quant. Grav.* **16** (1999) 3859-3877 arXiv: gr-qc/9905019.
- S. Major. “Embedded Graph Invariants in Chern-Simons Theory” *Nuc. Phys. B* **550** (1999) 531-560 arXiv: hep-th/9810071.
- V. Husain and S. Major. “Gravity and BF Theory Defined in Bounded Regions” *Nuc. Phys. B* **500** (1997) 381-401 arXiv: gr-qc/9703043.
- S. Major and L. Smolin. “Quantum Deformation of Quantum Gravity” *Nuc. Phys. B* **473** (1996) 267 arXiv: gr-qc/9512020.

R. Borissov, S. Major and L. Smolin. “The Geometry of Spin Networks” *Class. Quant. Grav.* **13** (1996) 3181 arXiv: gr-qc/9512043.

S. Major and L. Smolin. “Cosmological Histories for the New Variables of Ashtekar” *Phys. Rev. D* **51** (1995) 5475 arXiv: gr-qc/9402018.

\* Papers with undergraduate co-authors

### Conference Proceedings

\* S. A. Major and J. C. Zappala. “Granularity in Angle: Observability in Scattering Experiments” *Relativity and Gravitation: 100 years after Einstein in Prague* Springer Proceedings in Physics **157** (2014) 547.

F. Hinterleitner and S. Major. “Plane gravitational waves and flat space in loop quantum gravity” *Relativity and Gravitation: 100 years after Einstein in Prague* Springer Proceedings in Physics **157** (2014) 515.

S. Major. “Quantum Geometry Phenomenology: Angle and Semiclassical States” Proceedings of Loops11: Non-Perturbative / Background Independent Quantum Gravity (Madrid, 2011) *J. Phys.: Conf. Ser.* **360** (2012) 012061 arXiv:1112.4366.

F. Hinterleitner and S. Major. “Plane Gravitational Waves and Loop Quantization” Proceedings of Loops11: Non-Perturbative / Background Independent Quantum Gravity (Madrid, 2011) *J. Phys.: Conf. Ser.* **360** (2012) 012030.

S. Major. “Quantum Gravity with Undergraduates” Paper submitted for the AAPT Teaching GR conference Syracuse 20-21 July 2006 <http://www.aapt-doorway.org/TGRU/> [Not refereed].

S. Major. “New Operators for Spin Net Gravity” Proceedings of the Ninth Marcel Grossmann Meeting (Rome, 2000) <http://www.icra.it/MG/mg9/Proceedings/Proceedings.html> arXiv: gr-qc/0101032.

### Other Publications

S. Major. Book Review of “A First Course in Loop Quantum Gravity” by Rodolfo Gambini and Jorge Pullin (invited) *Am. J. Phys.* **80** (2012) 746.

S. Major. “Reform Unlikely to end uncertainty results at the polls” *Syracuse Post Standard* 4 November 2003, an Op-ed on uncertainty and closely contested elections.

S. Major and L. Smolin. “Mixmaster Quantum Cosmology in Terms of Physical Dynamics” arXiv: gr-qc/960720 [Not refereed].

### Research with Undergraduates

Steven Cunden – Hamilton '18  
Summer 2017, Senior Project

Elise LePage – Hamilton '18  
Summer 2017, Senior Project – Thesis: “Quantization of Plane Gravitational Waves in Loop Quantum Gravity”  
Perimeter Scholars International, University of California at Berkeley in Physics

John Pikus – Hamilton '17  
Summer and Senior Project 2016 – Thesis: “Black Hole Statistical Mechanics”  
Wasatch Academy, math teacher

Anna Mowat – Hamilton ‘18

Summers 2016, 2017 – “An App for Home Energy Efficiency”

Hamilton Adirondack Program Capstone Project 2016 – “Efficiency Rating and Suggestions for Residential Structures”

Senior Project in Environmental Studies 2017 Thesis – “Applications of Thermodynamics to Improve Home Cooling Efficiency”

Jake Davidson – Hamilton ‘15

Senior Project – Thesis: “Gravitational Wave effects on the Polarization of the Cosmic Microwave Background”

University of British Columbia in Physics

Connor Stevenson – Hamilton ‘15

Senior Project – Thesis: “Detecting Black Holes”

Kenneth Ratliff – Hamilton ‘16

Summer 2014

Syracuse University in Physics

Michael Verostek – Hamilton ‘16

Summer 2014

Syracuse University in Physics

Sunrose Shrestha – Hamilton ‘14

Senior Project – Thesis: “Analytic Approaches to Explain Bifurcations in Spin Network Dynamics”

Tufts University in Math

Christopher Lockwood – Hamilton ‘14

Senior Project – Thesis: “Constraints with Quantum Spin and the Statistical Mechanics of Black Holes”

Game Development Engineer at Wavedash Games

Tsion Tesfaye – Hamilton ‘16

Summer 2013

Entrepreneurial Leadership Fellow, African Leadership Academy

Grace Williams-DuHamel – Hamilton ‘15

Summer 2013

Sales Operations Specialist at Backupify

Jeremy Adelman – Hamilton ‘12

Senior Project – Thesis: “Towards the Quantization of Plane Gravitational Waves”

Post-Bac Research Assistant January - June 2013

University of California, Davis in Physics

Jake Zappala – Hamilton ‘12

Senior Project – Thesis: “Semiclassical States for an Atom of Geometry”

Ph.D. 2017 University of Chicago in Physics

Post-doc Argonne National Laboratory

Abrar Ahmed – Hamilton ‘14

Summer 2011

Business Intelligence Analyst at Foodpanda Bangladesh

Ileana Becerra – Hamilton ‘11

Senior Project 2010 – Thesis: “Deformed Special Relativity”

William Kalbacker – Hamilton ‘11

Senior Project – Thesis: “Deformed Special Relativity as a Coherent Model for Spacetime”

City College, Grove School of Engineering in Engineering

Gregory Schwedock – Hamilton ‘10

Summer 2008

The Climate Mobilization

Walter Schoen – Hamilton ‘08

Senior Project – Thesis: “Primordial Gravitational Waves with a Loop Quantum Gravity Correction Term”

Software Engineer Covidien

Timothy Minella – Hamilton ‘09

Summer 2007

Ph. D. 2015 University of South Carolina in History

Visiting Assistant Professor, Villanova University

Michael Gregg – Hamilton ‘08

Summers 2006, 2007, Senior Project – Thesis: “Modified dispersion relations and the Chandrasekhar mass”

SUNY Albany in Public Health

Yubo Lu – Hamilton ‘07

Summers 2006, 2007

J.D. 2010 Cornell Law School

LL.M. 2011 New York University School of Law

Manager, International Tax Services at EY

Julia MacDougall – Hamilton ‘08

Summer 2006

Ph. D. 2014 Brown University in Geological Sciences

Senior Scientist at Reviewed.com

Rob Silversmith – Clinton High School, Williams College ‘11

Summer 2006

Ph.D. 2017 University of Michigan in Math

Post-doc at the Simons Center for Geometry and Physics, Stony Brook

Alice Francis – Hamilton ‘06

Senior Project – Thesis: “Quantum Cosmological Effects on the Primordial Stochastic Gravitational Wave Background”

Benjamin Auerbach – Hamilton ‘05

Summer and Senior Project 2004 – Thesis: “Anisotropic Mass effects on the Foucault Pendulum”

Ph.D. 2011 Yale University in Physics

Fermilab

Sean McGovern – Hamilton ‘07

Summer 2004, Spring 2005, Senior Project 2006 – Thesis: “Numerical Experiments in Spin Network Dynamics”

M.S. 2010 University of Virginia in Physics  
 Universität Wuppertal in Computer Science

Nancy Shaw – Hamilton '07

Summer 2004, Senior Project 2006 – Thesis: “Effective Potential of Massive Objects and Photons near Black Holes”

M.S. 2013 SUNY New Paltz in Computer Science

Daniel Heyman – Hamilton '03

Summer and Senior Project 2002 – Thesis: “Is Double Special Relativity Consistent with the Relativity Principle?”

M.A. 2009 New York University in English

Financial Advisor at Merrill Lynch

Julien LeBrun – Paris VI

Summer 2002 (French exchange student)

Tomasz Konopka – Hamilton '02 Summer and Senior Project 2001 – Thesis: “Quantum Gravity Effects on Ultra High Energy Particles”

Ph.D. 2007 University of Waterloo/Perimeter Institute in Physics

Ludwig Institute for Cancer Research, Oxford

Kevin Setter – Swarthmore '02

Summers 2000, 2001 and Honors Thesis: “On the Statistical Mechanics of Quantum Geometry”

Cambridge University, Ph.D. 2013 Caltech in Physics

Visiting Assistant Professor of Physics, Haverford

Michael Seifert – Swarthmore '01

Summer 2000, Honors Thesis (Apker Award finalist): “Angle and Volume Studies in Quantized Space”

Ph.D. 2008 University of Chicago in Physics

Assistant Professor of Physics, Connecticut College

### **Courses Taught**

Humanity’s Global Impact and the Adirondacks (College 370)

Hamilton Adirondack Program 2016

Physics I: Algebra based Mechanics (Phys 100 and lab)

Hamilton 2012, 2007

Survey of Physics: Calculus based Mechanics (Phys 200 and lab)

Hamilton 2013, 2006

Physics 4: Calculus based Electromagnetism

Swarthmore 2000

Spacetime and the Quantum World (Phys 135)

Hamilton 2010, 2008 Deep Springs 2000

Waves and Fields (Phys 195 and lab)

Hamilton 2018, 2017, 2014, 2013, 2012, 2009, 2006, 2005, 2003, 2001

Introduction to Quantum Mechanics (Phys 237)

The Pennsylvania State University (1996)

- Space: Its light, its shape (Soph 230)  
Hamilton 2005
- Electromagnetism (Phys 295)  
Hamilton 2015
- Mathematical Methods for Physicists (Phys 320)  
Hamilton 2017, 2015, 2011, 2009, 2007, 2003, 2001
- General Relativity (Phys 325)  
Hamilton 2018, 2014, 2012, 2002
- Electrodynamics (Phys 480)  
Hamilton 2014, 2007, Swarthmore 1999
- Classical Mechanics (Phys 350)  
Hamilton 2013, 2011, 2010, 2005, 2004, 2001, 2000
- Quantum Theory (Phys 450)  
Hamilton 2014, 2012, 2008, 2006

#### Invited Talks

- “Seeing and Quantizing Black Holes”, Colloquium, Colgate University, 26 September 2016.
- “On Hopes for Testing Quantum Gravity Theories”, Carlo Fest, Marseille, 25 May 2016.
- “Quantizing Gravity: Atoms of geometry and possible links to observation”, Colloquium, Louisiana State University, Baton Rouge, LA, 26 September 2013.
- “Bits of Geometry”, Sigma Xi talk, Hamilton College, Clinton NY, 2 November 2012.
- “On the Observability of Discrete Spatial Geometry”, Experimental Search for Quantum Gravity - the hard facts, Perimeter Institute, Waterloo (Canada), 24 October 2012.
- “The Attractiveness of Loops and Ribbons”, Mathematics colloquium (sponsored by SIAM) RPI, Troy NY, 4 February 2008.
- “A Stellar Life without Lorentz Invariance” Anacapa Society Board Meeting, Amherst College, Amherst MA, 5 January 2008.
- “Phenomenology of Discrete Space: Possible effects, possible tests” Experimental Signatures of Quantum Gravity Workshop, Perimeter Institute, Waterloo (Canada), 7 November 2007.
- “Quantum Gravity: Physics?” University of Massachusetts, Dartmouth MA, 14 March 2007.
- “Quantum Gravity: Physics?” Union College, Schenectady NY, 20 February 2007.
- “Quantum Gravity: Physics?” Ithaca College, Ithaca NY, 25 October 2006.
- “Quantum Gravity Phenomenology: Discrete Machian Model” Syracuse University, Syracuse NY, 10 April 2006.
- “Quantum Gravity: Is it Physics?” Williams College, Williamstown MA, 10 March 2006.
- “Quantum Gravity and Physics: How the former may become the latter” Amherst College, Amherst MA, 7 October 2004.

- “Loop Quantum Geometry: An Introduction” University of Massachusetts, Amherst MA, 8 October 2004.
- “Juggling Fire: Life without Lorentz Invariance” University of New Brunswick, Fredericton NB (Canada), 14 November 2002
- “Life without Lorentz Invariance: Good, worthwhile, or merely crazy?” Perimeter Institute/CITA (U. Toronto) Mini-Workshop, Waterloo ON (Canada), 30 October 2002
- “Observational Limits on Quantum Geometry Effects” Perimeter Institute, Waterloo ON (Canada), 9 Jan 2002.
- “Gravitational Statistical Mechanics”, Center for Gravitational Physics and Geometry, PennState, University Park PA, 21 March 2001.
- “Gravitational Statistical Mechanics: A Model”, Syracuse University, Syracuse NY, 27 November 2000.
- “Quantum Gravity: Habitat, Tools, and Possible Observational Consequences” Amherst College, Amherst MA, 27 January 2000.
- “Towards Quantum Gravity: Discrete Geometry - Observational Consequences” Hamilton College, Clinton NY, 29 Feb 2000.
- “Towards Quantum Gravity: Discrete Geometry - Observational Consequences” Technical University, Vienna (Austria), 18 June 1999.
- “Spin Networks: Tools for Non-perturbative Quantization” Masaryk University, Brno (CR), 16 June 1999.
- “On the Way to Quantum Gravity: Discrete Geometry and Potentially Observable Consequences” Masaryk University, Brno (CR), 19 May 1999.
- “Towards Quantum Gravity: Discrete Geometry – Observable Consequences” Swarthmore College, Swarthmore PA, 29 March 1999.
- “Spin Networks: Tools and a Puzzle for Quantum Gravity” University of Vienna, Vienna (Austria), 20 June 1998.
- “Loops, Spin Networks, and Recoupling Theory: Tools for the canonical quantization of gravity” University of New Brunswick, Fredericton NB (Canada), 31 October 1996.
- “Quantum Deformation of Quantum Gravity” The Pennsylvania State University, University Park PA, 8 February 1996.
- “Quantum Spin Networks” University of Pittsburgh, Pittsburgh PA, 20 April 1995.

### Conference Presentations

- “Quantization of Plane Gravitational Waves: An Update” GR 21, Columbia, New York City, 14 July 2016.
- “Quantization of Plane Gravitational Waves: Kinematic and dynamic considerations” Loops 2015 Conference, Erlangen (Germany), 6 July 2015.
- “On the Quantization of Plane Gravitational Waves: Hunting for Flat Space” APS April Meeting, Baltimore, 11 April 2015.



- “On Loop Quantization of Plane Gravitational Waves” GR 20 Meeting, Warsaw (Poland) 9 July 2013 and Loops13 Conference, Waterloo (Canada) 26 July 2013.
- “On the Observability of the Granularity of Spatial Geometry” Relativity and Gravitation – 100 years after Einstein in Prague, Prague (Czech Republic), 25 June 2012.
- “Coherent States and Quantum Geometry Phenomenology” APS April Meeting, Atlanta GA, 1 April 2012.
- “Shape in an Atom of Geometry” Loops ‘11, Madrid (Spain), 23 May 2011.
- “Quantum Geometry Phenomenology: Angle” APS April Meeting, Los Angeles CA, 30 April 2011.
- “Shape in an Atom of Space: Exploring quantum geometry phenomenology” GR 19, Mexico City (Mexico), 6 July 2010.
- “Modified Dispersion Relations and the Chandrasekhar Mass Limit” Quantum Geometry and Quantum Gravity Conference (Loops ‘08), Nottingham (UK), 3 July 2008.
- “Phenomenology of Discrete Space: Possible effects, possible tests” Experimental Signatures of Quantum Gravity Workshop, Perimeter Institute, Waterloo ON (Canada), 7 November 2007.
- “An alternative to the loop algebra of  $q$ -Quantum Gravity?” Loops ‘07, Morelia (Mexico), 26 June 2007.
- “Discrete Geometry Phenomenology” East Coast Gravity Meeting, MIT, Cambridge MA, 24 March 2006. Alice Francis ‘06 also presented “Quantum Gravity Effects on the Stochastic Gravitational Wave Background”.
- “A Discrete Machian Model: Fermionic Sector” Loops ‘05 Conference Max Planck Institute for Gravitational Physics, Potsdam (Germany), 10 October 2005.
- “Lorentz Violation in Particle Processes: A signature of quantum gravity? 27th Annual Montreal-Rochester-Syracuse-Toronto conference on high energy physics (MRST ‘05), SUNY IT, Utica (NY), 16 May 2005.
- “Quantum Geometry Phenomenology: A Discrete Machian Proposal” 17th International Conference on General Relativity and Gravitation (GR17), Dublin (Ireland), 22 July 2004.
- “Quantum Cosmology from Quantum Geometry: A Lorentzian Model”, East Coast Gravity Meeting, Bowdoin College, 11 June 2004.
- “Quantum Geometry Phenomenology: A Discrete Machian Proposal 17th International Conference on General Relativity and Gravitation (GR17), Dublin (Ireland), July 2004.
- “A Discrete Machian Model” Quantum Gravity of the Americas, Perimeter Institute, Waterloo ON (Canada), 31 October 2004.
- “Exploring Quantum Gravity with Undergraduates”, Theorists at Primarily Undergraduate Institutions Workshop, Kavli Institute for Theoretical Physics, Santa Barbara, 21 July 2003.
- “Observations on a Lorentzian Model” Loops and Spin foams conference (Loops ‘04), CIRM, Luminy (France) 3-7 May 2004.
- “Where’s the Relativity? Exploring modifications to Lorentz Invariance”, East Coast Gravity Meeting University of Maryland, College Park MD, 29 March 2003.
- “Is there R is DSR? Constraints on the ‘new relativity’”, April APS Meeting, Philadelphia PA, 5 April 2003.

“Quantum Gravity and Observation: A first look at second generation threshold constraints”, Gravitation: A Decennial Perspective, Center for Gravitational Physics and Geometry, PennState, University Park PA, 11 June 2003.

“Discrete Geometry - Possible Tests: GZK Threshold, Cherenkov Radiation, and Atomic Energy Levels” 16th International Conference on General Relativity and Gravitation (GR16), Durban (South Africa), July 2001.

“New Results for Quantum Geometric Operators” Workshop on Canonical and Quantum Gravity III, Banach Center, Warsaw (Poland), 7-19 June 2001.

“New Geometric Operators for Quantum Gravity” Ninth Marcel Grossmann Meeting on General Relativity, Rome (Italy), 2-8 July 2000.

“Surface Observables for Gravity” Fourth Penn State Conference “New Voices in Relativity and Quantum Gravity”, University Park PA, 8-10 November 1996.

“Quantize and Evolve” Seventh Marcel Grossmann Meeting on General Relativity, Stanford University, Stanford CA, 24-29 July 1994.

#### **Professional activities - Hamilton College**

Dean Search Committee 2017.

Chair, Department of Physics (2014-2015, 2017-present) Chair of Science Chairs (2017-18).

Academic Council (2016-present) Elected *Advisory committee for the Dean*.

Faculty Mentor (2017 - 2018).

Committee on Appointments (2013-15) Elected *Tenure and Promotion*.

Ad hoc Long-term Planning Committee (2014-15) *Allocation and Personnel*.

Adirondack Program Committee (2014-18).

Faculty Appeals Board Committee, Chair (2013) Elected.

Sub-Committee on First Year Courses (2013).

Committee on Academic Policy (2005-08 and 2010-11, Chair 2007-08 and 2010-11) Elected *College curriculum and allocation of faculty resources*.

Assessment Advisory Group (2009 - 15).

Honor Court (2004) Elected.

Green Team for Science Center (2000-2002).

#### **Professional activities - External**

External Reviewer – Lawrence University Physics Department February 2018.

Selection Committee for American Physical Society Prize for a Faculty Member for Research in an Undergraduate Institution (2013 - 2016).

Anacapa Society Board (2007 - current )

Honors examiner – Swarthmore College Physics Honors Exams (2010, 2011)

External reader – “Time and Clocks in Quantum Cosmology”, the Ph.D. dissertation of Emília Kubalová at Masaryk University, Brno (CR), May 2014.

External examiner – “Emergence and Phenomenology in Quantum Gravity”, the Ph.D. thesis of Isabeau Prémont-Schwarz, University of Waterloo, Waterloo ON (Canada), 22 April 2010.

External reader – “Model Examples of Quantum Cosmology”, the Ph.D. dissertation of Roman Šteigl at Masaryk University, Brno (CR), May 2009.

External reviewer for 6 tenure and promotion cases in the United States and Canada (2009 - present).

Reviewed papers for American Journal of Physics, Classical and Quantum Gravity, General Relativity and Gravitation, International Journal of Modern Physics D, New Journal of Physics, Physical Review Letters, Physical Review D, Reports in Physics, SIGMA.

Reviewed grant proposals for Research Corporation and NSF MRI (on campus)

### **Grants and Awards**

Christian A. Johnson Teaching Enhancement Award  
Hamilton College, 2015.

Dean’s Scholarly Achievement Award for Early Career Achievement  
Hamilton College, 2012.

“Discrete Geometry Phenomenology and an Inner Product for Cosmology”  
Renewal: Cottrell Science Grant, Research Corporation, approved May 2005, \$26k (\$34k total).

“Observational Constraints on Quantum Geometry Effects”  
Cottrell Science Grant, Research Corporation, approved November 2002, \$28k.

“Gravitational Lensing: A Theoretical Physics Project for Physics 390”  
Class of 1966 Career Development Award, Hamilton College, Summer 2002.

Sigma Xi, 1991.

### **Memberships**

American Association of Physics Teachers

American Physical Society

Anacapa Society

International Society on General Relativity and Gravitation