Howard S. Cohl

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Education

Doctor of Philosophy (**Mathematics**) 2010 University of Auckland
Auckland, New Zealand
Ph.D. Thesis: Fourier and Gegenbauer expansions for fundamental solutions of the Laplacian and powers in $\mathbf{R}^d$ and $\mathbf{H}^d$
Ph.D. Supervisors: A.F.M. Tom ter Elst & A. Rod Gover

Doctor of Philosophy, Master of Science (**Physics**) 1999, 1994 Louisiana State University
Baton Rouge, Louisiana
Ph.D. Thesis: On the Numerical Solution of the Cylindrical Poisson Equation for Isolated Self-Gravitating Systems
Ph.D. Supervisor: Joel E. Tohline

Bachelor of Science (**Astronomy and Astrophysics**) 1990 Indiana University
minor: Mathematics
Bloomington, Indiana

Fellowships, Honors, and Awards

2019 Named *Technical Editor* for the NIST DLMF (https://dlmf.nist.gov) Project
2017 NIST ACMD Award for Extraordinary Service as a Student Mentor ($1000)
2014 Selected for inclusion in Marquis Who's Who in America 2015 (69^{th} Edition)
2013 Figure from Cohl & Volkmer (2013) used as cover art for June *J. Math. Phys* **54** 6
2012 Figure from Cohl & Kalnins (2012) used as print edition cover image for *J. Phys. A* **45** 14
2011 Runner-up NIST Sigma Xi Postdoctoral Poster Presentation
2010-12 National Research Council Postdoctoral Research Associateship ($145,500)
2010 Travel grant from New Zealand Mathematical Society (NZ$1000)
2010 Three Month Stipend to Enhance Univ. of Auckland 2012 PBRF Performance (NZ$5000)
2009 First Prize, Student Research Conference, Dept. of Mathematics, University of Auckland
2008-09 University of Auckland International Doctoral Scholarship
2006 Certificate of Merit, Department of Mathematics, University of Auckland
1994-98 National Science Foundation Graduate Research Traineeship
1990 Research Excellence in Astronomy, IU College of Arts and Sciences Alumni Association
1989 Howard L. Demastus Award, National Solar Observatory, Sunspot, NM
1985 Eagle Scout, Boy Scouts of America

Association memberships

American Mathematical Society (2007-19)
OpenMath Association (2019)
MathML Association (2016-19)
New Zealand Mathematical Society (2007-19)
Australian and New Zealand Association of Mathematical Physics (2019)
Society for Industrial and Applied Mathematics (SIAM) (2002-03, 2007-19)
SIAM Activity Group on Orthogonal Polynomials and Special Functions

Employment history

2017-present	Mathematician, Applied and Computational Mathematics Division, National Institute of Standards and Technology, Mission Viejo, CA
2010-2017	Mathematician, Applied and Computational Mathematics Division, National Institute of Standards and Technology, Gaithersburg, MD
2006-2010	Teaching Assistant, Lecturer, Department of Mathematics, University of Auckland, Auckland, N.Z.
2003-2006	Postdoctoral Research Fellow with Matthew Bate, Astrophysics Group, School of Physics, University of Exeter, Exeter, Devon, U.K.
2001-2002	Postdoctoral Researcher with Peter Eggleton and the Djehuty Team, Institute of Geophysics & Planetary Physics, University of California, Lawrence Livermore National Laboratory, Livermore, California, U.S.A.
2000-2001	Senior Principal Analyst/Training Systems Support Manager, Programming Environment & Training (Logicon, Inc.) Naval Oceanographic Office MSRC, Stennis Space Center, MS
1999-2000	Postdoctoral Researcher with Prof. Dana A. Browne, Department of Physics and Astronomy, Louisiana State University
1992-1998	Teaching Assistant (1992-93), Research Assistant, NSF GRT (1994-98), Department of Physics and Astronomy, Louisiana State University
1990-1992	Research Associate, National Solar Observatory, Sunspot, NM, Sacramento Peak
1989-1990	Undergraduate Internship, Department of Mathematics, Indiana University
Summer 1989	Research Experience for Undergraduates, National Solar Observatory, Sunspot, NM, Sacramento Peak

Journal articles

1. "Generalizations of linearization formulae for continuous hypergeometric orthogonal polynomials," Howard S. Cohl, Roberto S. Costas-Santos, and Jason Zhao, 2019 (submitted).
2. "Generalizations of generating functions for basic hypergeometric orthogonal polynomials," Howard S. Cohl, Roberto S. Costas-Santos, P. R. Hwang, and Tanay V. Wakhare, 2019 (submitted).
3. "Terminating Basic Hypergeometric Representations and Transformations for the Askey-Wilson Polynomials," Howard S. Cohl, Roberto S. Costas-Santos and Linus Ge, 2020, *Symmetry*, **12**, 8, 1290, 14 pages.
4. "Semantic Preserving Bijective Mappings for Expressions involving Special Functions between Computer Algebra Systems and Document Preparation Systems," André Greiner-Petter, Howard S. Cohl, Moritz Schubotz and Bela Gipp, 2019, *Aslib Journal of Information Management*, **71**, 3, 415-439, 24 pages.
5. "On a generalization of the Rogers generating function," Howard S. Cohl, Roberto S. Costas-Santos, and Tanay V. Wakhare, 2019, *Journal of Mathematical Analysis and Applications*, **475**, 2, 1019-1043, 25 pages.
6. "Improving the representation and conversion of mathematical formulae by considering their textual context," reprint of https://doi.org/10.1145/3197026.3197058, Moritz Schubotz, André Greiner-Petter, Philipp Scharpf, Norman Meuschke, Howard S. Cohl, and Bela Gipp, 2018, *TUGBOAT, The Communications of the TEX Users Group*, **39**, 3, 228-240, 13 pages.
7. "Fundamental Solutions and Gegenbauer Expansions of Helmholtz Operators in Riemannian Spaces of Constant Curvature," Howard S. Cohl, Thinh H. Dang, and T. M. Dunster, 2018, *Symmetry, Integrability and Geometry: Methods and Applications*, *Special Issue on Orthogonal Polynomials, Special Functions and Applications (OPSFA14)*, **14**, 136, 45 pages.
8. "Some generating functions for q-polynomials," Howard S. Cohl, Roberto S. Costas-Santos, and Tanay V. Wakhare, 2018, *Symmetry*, **10**, 12, 758, 12 pages.

9. "The power collection method for connection relations: Meixner polynomials," Michael A. Baeder, Howard S. Cohl, Roberto S. Costas-Santos, and Wenqing Xu, 2017, *Journal of Classical Analysis*, **11**, 2, 107-128, 22 pages.
10. "Some dual definite integrals for Bessel functions," Howard S. Cohl, Sean J. Nair, and Rebekah M. Palmer, 2016, *Scientia, Series A, Mathematical Sciences*, **27**, 15-30, 16 pages.
11. "Convergence of Magnus integral addition theorems for confluent hypergeometric functions," Howard S. Cohl, Jessie Hirtenstein, and Hans Volkmer, 2016, *Integral Transforms and Special Functions*, **27**, 10, 767-774, 8 pages.
12. "Report from the Open Problems session at OPSFA13," Richard A. Askey, Rick K. Beatson, Ted S. Chihara, Charles F. Dunkl, Christoph Koutschan, Sheehan Olver, Yuan Xu, Wolfgang zu Castell, and Wadim Zudilin, 2016, *Symmetry, Integrability and Geometry: Methods and Applications*, *Special Issue on Orthogonal Polynomials, Special Functions and Applications*, **12**, 071, 12 pages.
13. "Open problems at OPSFA-12, Sousse, Tunisia," Christian Berg, Mohamed J. Atia, Howard S. Cohl, Anbu Swaminathan, and Walter Van Assche, 2015, **26**, 2, 90-95, 6 pages.
14. "Generalizations of generating functions for higher continuous hypergeometric orthogonal polynomials in the Askey scheme," Michael A. Baeder, Howard S. Cohl, and Hans Volkmer, 2015, *Journal of Mathematical Analysis and Applications*, **427**, 1, 377-398, 22 pages.
15. "Fourier and Gegenbauer expansions for a fundamental solution of Laplace's equation in hyperspherical geometry," Howard S. Cohl and Rebekah M. Palmer, 2015, *Symmetry, Integrability and Geometry: Methods and Applications*, *Special Issue on Exact Solvability and Symmetry Avatars in honour of Luc Vinet*, **11**, 015, 23 pages.
16. "Measurement and Analysis of the Lowest Resonant Mode of a Spherical Annular-Sector Patch Antenna," Steven Weiss, Amang Boliong, and Howard S. Cohl, 2015, *Institution of Engineering and Technology (IET) Microwaves, Antennas & Propagation*, **9**, 2, 95-100, 6 pages.
17. "Expansions for a fundamental solution of Laplace's equation on $\mathbf{R}^3$ in 5-cyclidic harmonics," Howard S. Cohl and Hans Volkmer, 2014, *Analysis and Applications*, *Special Issue: Dedicated to the Memory of Frank Olver*, **12**, 6, 613–633, 21 pages.
18. "Generalizations and specializations of generating functions for Jacobi, Gegenbauer, Chebyshev and Legendre polynomials with definite integrals," Howard S. Cohl and Connor MacKenzie, 2013, *Journal of Classical Analysis*, **3**, 1, 17–33, 17 pages.
19. [≥ 5 citations] "On a generalization of the generating function for Gegenbauer polynomials," Howard S. Cohl, 2013, *Integral Transforms and Special Functions*, **24**, 10, 807–816, 10 pages.
20. "Publisher's Note: "Separation of variables in an asymmetric cyclidic coordinate system" [J. Math. Phys. 54, 6, 063513 (2013)]", Howard S. Cohl and Hans Volkmer, 2013, *Journal of Mathematical Physics*, **54**, 7, 079904, 1 page.
21. "Generalizations of generating functions for hypergeometric orthogonal polynomials with definite integrals," Howard S. Cohl, Connor MacKenzie, and Hans Volkmer, 2013, *Journal of Mathematical Analysis and Applications*, **407**, 2, 211–225, 15 pages.
22. "Separation of variables in an asymmetric cyclidic coordinate system," Howard S. Cohl and Hans Volkmer, 2013, *Journal of Mathematical Physics*, **54**, 6, 063513, 23 pages.
23. "Fourier expansions for a logarithmic fundamental solution of the polyharmonic equation," Howard S. Cohl, 2013, *Journal of Classical Analysis*, **2**, 2, 107–127.
24. [≥ 5 citations]
25. "Fourier, Gegenbauer and Jacobi expansions for a power-law fundamental solution of the polyharmonic equation and polyspherical addition theorems," Howard S. Cohl, 2013, *Symmetry, Integrability and Geometry: Methods and Applications*, **9**, 042, 26 pages.
26. "Definite integrals using orthogonality and integral transforms," Howard S. Cohl and Hans Volkmer, 2012, *Symmetry, Integrability and Geometry: Methods and Applications*, **8**, 077, 10 pages.

27. "Erratum: "Developments in determining the gravitational potential using toroidal functions"" Howard S. Cohl, 2012, *Astronomische Nachrichten*, **333**, 8, 784–785.
28. [$\geq$ 5 citations] "Eigenfunction expansions for a fundamental solution of Laplace's equation on $\mathbf{R}^3$ in parabolic and elliptic cylinder coordinates," Howard S. Cohl and Hans Volkmer, 2012, *Journal of Physics A: Mathematical and Theoretical*, **45**, 35, 355204, 20 pages.
29. "Table Errata to "Formulas and theorems for the special functions of mathematical physics," by W. Magnus, F. Oberhettinger & R. P. Soni (1966)," Howard S. Cohl, 2012, *Mathematics of Computation*, **81**, 280, 2251–2251.
30. [$\geq$ 5 citations] "Fourier and Gegenbauer expansions for a fundamental solution of the Laplacian in the hyperboloid model of hyperbolic geometry," Howard S. Cohl and Ernie G. Kalnins, 2012, *Journal of Physics A: Mathematical and Theoretical*, **45**, 14, 145206, 32 pages.
31. [$\geq$ 5 citations] "Generalized Heine's identity for complex Fourier series of binomials," Howard S. Cohl and Diego E. Dominici, 2011, *Proceedings of The Royal Society of London. Series A*, **467**, 333–345.
32. [$\geq$ 5 citations] "Opposite Antipodal Fundamental Solution of Laplace's Equation in Hyperspherical Geometry" (previously "Fundamental Solution of Laplace's Equation in Hyperspherical Geometry"), Howard S. Cohl, 2011, *Symmetry, Integrability and Geometry: Methods and Applications*, **7**, 108, 14 pages.
33. "On Parameter Differentiation for Integral Representations of Associated Legendre Functions," Howard S. Cohl, 2011, *Symmetry, Integrability and Geometry: Methods and Applications*, *Special Issue on Symmetry, Separation, Super-integrability and Special Functions (S^4)*, **7**, 050, 16 pages.
34. [$\geq$ 10 citations] "Exact Fourier expansion in cylindrical coordinates for the three-dimensional Helmholtz Green function," John T. Conway and Howard S. Cohl, 2010, *Zeitschrift für Angewandte Mathematik und Physik*, **61**, 3, 425–443.
35. [$\geq$ 5 citations] "Derivatives with respect to the degree and order of associated Legendre functions for $|z| > 1$ using modified Bessel functions," Howard S. Cohl, 2010, *Integral Transforms and Special Functions*, **21**, 8, 581–588.
36. [$\geq$ 15 citations] "On the Relative Motions of Dense Cores and Envelopes in Star-Forming Molecular Clouds," Ben A. Ayliffe, James C. Langdon, Howard S. Cohl, and Matthew R. Bate, 2007, *Monthly Notices of the Royal Astronomical Society*, **374**, 4, 1190–1206.
37. [$\geq$ 35 citations] "Useful Alternative to the Multipole Expansion of $1/r$ Potentials," Howard S. Cohl, A. R. P. Rau, Joel E. Tohline, Dana A. Browne, John E. Cazes, and Eric I. Barnes, 2001, *Physical Review A*, **64**, 5, 52509.
38. [$\geq$ 40 citations] "Developments in Determining the Gravitational Potential Using Toroidal Functions," Howard S. Cohl, Joel E. Tohline, A. R. P. Rau, and Hari M. Srivastava, 2000, *Astronomische Nachrichten*, **321**, 5/6, 363–372.
39. [$\geq$ 90 citations] "A Compact Cylindrical Green's Function Expansion for the Solution of Potential Problems," Howard S. Cohl and Joel E. Tohline. 1999, December 10, *The Astrophysical Journal*, **527**, 86–101.
40. [$\geq$ 50 citations] "The Solar White Light Flare of 1989 March 7: Simultaneous Multiwavelength Observations at High Time Resolution," Donald F. Neidig, Alan L. Kiplinger, Howard S. Cohl, and Philip H. Wiborg. 1993, March 20. *The Astrophysical Journal* **406**, 306–318.
41. [$\geq$ 15 citations] "Dynamic Instabilities in Rotating, Low–Mass Protostars during Early Disk Formation," Shelby Yang, Richard H. Durisen, Howard S. Cohl, James N. Imamura, and Joseph Toman. 1991, *Icarus* **91**, 14–28.

Book chapters

1. "The orthogonality of Al-Salam-Carlitz polynomials for complex parameters," Howard S. Cohl, Roberto S. Costas-Santos, Wenqing Xu, 2017, *Frontiers in Orthogonal Polynomials and q-Series*, World Scientific Publishing, eds. Zuhair Nashed and Xin Li).

Conference proceedings

1. "Towards Formula Concept Discovery and Recognition," Philipp Scharpf, Moritz Schubotz, Howard S. Cohl, and Bela Gipp, 2019, Sun SITE Central Europe (CEUR) Workshop Proceedings, Proceedings of the 4th Joint Workshop on Bibliometric-enhanced Information Retrieval and Natural Language Processing for Digital Libraries (BIRNDL) co-located with the 42nd International ACM SIGIR Conference, **2414**, Eds. M. K. Chandrasekaran, P. Mayr, pp. 108–115, http://ceur-ws.org/Vol-2414/, 2019.
2. "MathTools: An Open API for Convenient MathML Handling," André Greiner-Petter, Howard S. Cohl, Moritz Schubotz and Bela Gipp, 2018, Intelligent Computer Mathematics, Lecture Notes in Computer Science **11006**, Springer, Eds. F. Rabe, W. Farmer, G. O. Passmore, A. Youssef, pp. 104–110, 2018.
3. "Automated Symbolic and Numerical Testing of DLMF Formulae using Computer Algebra Systems," Howard S. Cohl, André Greiner-Petter, and Moritz Schubotz, 2018, Intelligent Computer Mathematics, Lecture Notes in Computer Science **11006**, Springer, Eds. F. Rabe, W. Farmer, G. O. Passmore, A. Youssef, pp. 39–52, 2018.
4. "Content dictionary description: select symbols from Chapter 9 of the `KLS` dataset in the DRMF," Moritz Schubotz and Howard S. Cohl, OpenMath Workshop in Conference on Intelligent Computer Mathematics, July 17-21, 2017.
5. "Sampling Architectures for Ultra-Wideband Signals," Stephen D. Casey and Howard S. Cohl, Sampling Theory and Applications, 12th International Conference, July 3-7, 2017. https://doi.org/10.1109/SAMPTA.2017.8024452, 2017.
6. "Semantic Preserving Bijective Mappings of Mathematical Formulae between Document Preparation Systems and Computer Algebra Systems," Howard S. Cohl, Moritz Schubotz, Abdou Youssef, André Greiner-Petter, Jürgen Gerhard, Bonita V. Saunders, Marjorie A. McClain, Joon Bang, and Kevin Chen, 2017, Intelligent Computer Mathematics, Lecture Notes in Artificial Intelligence **10383**, Springer, Eds. H. Geuvers, M. England, O. Hasan, F. Rabe, O. Teschke, pp. 115–131, 2017.
7. "VMEXT: A Visualization Tool for Mathematical Expression Trees," Moritz Schubotz, Norman Meuschke, Thomas Hepp, Howard S. Cohl, and Bela Gipp, 2017, Intelligent Computer Mathematics, Lecture Notes in Artificial Intelligence **10383**, Springer, Eds. H. Geuvers, M. England, O. Hasan, F. Rabe, O. Teschke, pp. 340–355, 2017.
8. "Getting the units right," Moritz Schubotz, David Veenhuis, and Howard S. Cohl, 2016, Work in Progress Paper, 9$^{\text{th}}$ Conference on Intelligent Computer Mathematics, Bialystok, Poland, July 25-29, 2016.
9. [$\geq$ 10 citations] "Semantification of Identifiers in Mathematics for Better Math Information Retrieval," Moritz Schubotz, Alexey Grigorev, Marcus Leich, Howard S. Cohl, Norman Meuschke, Bela Gipp, Abdou Youssef, and Volker Markl, 2016, The 39$^{\text{th}}$ Annual ACM Special Interest Group on Information Retrieval Conference (SIGIR 2016), Pisa, Tuscany, Italy, July 17-21, 2016.
10. "Challenges of Mathematical Information Retrieval in the NTCIR-11 Math Wikipedia Task," Moritz Schubotz, Abdou Youssef, Volker Markl, and Howard S. Cohl, 2015, The 38$^{\text{th}}$ Annual ACM Special Interest Group on Information Retrieval Conference (SIGIR 2015), Santiago, Chile, August 9-13, 2015.
11. [$\geq$ 5 citations] "Growing the Digital Repository of Mathematical Formulae with Generic LaTeX Sources," Howard S. Cohl, Moritz Schubotz, Marje A. McClain, Bonita V. Saunders, Cherry Y. Zou, Azeem S. Mohammed, and Alex A. Danoff, 2015, Intelligent Computer Mathematics, Lecture Notes in Artificial Intelligence **9150**, Springer, Eds. M. Kerber, J. Carette, C. Kaliszyk, F. Rabe, V. Sorge, pp. 280–287.
12. "UWB Signal Processing: Projection, B-Splines, and Modified Gegenbauer Bases," Stephen D. Casey and Howard S. Cohl, 2015, Sampling Theory and Applications 11$^{\text{th}}$ International Conference 2015, American University, Washington DC, USA, May 25-29. https://doi.org/10.1109/SAMPTA.2015.7148840, 2015.

13. "Evaluation of Similarity-Measure Factors for Formulae based on the NTCIR-11 Math Task," Moritz Schubotz, Abdou Youssef, Volker Markl, Howard S. Cohl, and Jimmy J. Li, 2014, Proceedings of the 11^{th} NTCIR Conference, Tokyo, Japan, December 9-12, 6 pages.
14. [≥ 5 citations] "Digital Repository of Mathematical Formulae," Howard S. Cohl, Marjorie A. McClain, Bonita V. Saunders, Moritz Schubotz, and Janelle C. Williams, 2014, Intelligent Computer Mathematics, Lecture Notes in Artificial Intelligence **8543**, Springer, Eds. S. M. Watt, J. H. Davenport, A. P. Sexton, P. Sojka, J. Urban, pp. 419–422.
15. "Discrete Fourier Inversion of Linear Inhomogeneity," Howard S. Cohl, 2004, Proceedings of Institute of Mathematics of National Academy of Sciences of Ukraine, **50**, Part 3, pp. 1288–1293.
16. "Portent of Heine's Reciprocal Square Root Identity," Howard S. Cohl, 2002, Proceedings of the 3D Stellar Evolution Workshop, Eds. R. Cavallo, S. Keller, S. Turcotte, Livermore, California, pp. 70–75.
17. "The Formation of Common–Envelope, Pre–Main–Sequence Binary Stars," Joel E. Tohline, John E. Cazes, and Howard S. Cohl, 1999, Proceedings of Numerical Astrophysics 1998, Ed. T. Hanawa **240**, pp. 155–158.
18. "Parallel Implementation of a Data–Transpose Technique for the Solution of Poisson's Equation in Cylindrical Coordinates," Howard S. Cohl, Xian–He Sun, and Joel E. Tohline, 1997, Proceedings of the 8^{th} SIAM Conference on Parallel Processing for Scientific Computing, Minneapolis, Minnesota, March 1997, 8 pages.

Articles in preparation

1. "Binomial and logarithmic Gegenbauer expansions for the even-dimensional polyharmonic equation," Howard S. Cohl and Jessica E. Hirtenstein, 2019.
2. "Gauss hypergeometric representations of Ferrers functions of the second kind," Howard S. Cohl, Justin Park, and Hans Volkmer, 2019.
3. "Experimental Math Search for Hypergeometric Orthogonal Polynomial Generating Functions," Isabelle C. Berger, Howard S. Cohl, Bruno Salvy, and Catherine E. Traini, 2019.

Theses

1. "Fourier and Gegenbauer expansions for fundamental solutions of the Laplacian and powers in $\mathbf{R}^d$ and $\mathbf{H}^d$," Howard S. Cohl, The University of Auckland, Ph.D. thesis, xiv+190 pages. 2010.
2. "On the Numerical Solution of the Cylindrical Poisson Equation for Isolated Self–Gravitating Systems," Howard S. Cohl, Louisiana State University and Agricultural and Mechanical College, Ph.D. thesis, ix+122 pages. 1999.

Conference presentations and Abstracts

1. "Semantic Preserving Bijective Mappings of Mathematical Formulae between Semantic LaTeX and Computer Algebra Systems," H. S. Cohl, July 18, 2017, 10^{th} Conference on Intelligent Computer Mathematics, University of Edinburgh, Edinburgh, Scotland, UK.
2. "Binomial and logarithmic Gegenbauer expansions for the even-dimensional polyharmonic equation," H. S. Cohl, July 4, 2017, The 14^{th} International Symposium on Orthogonal Polynomials, Special Functions and Applications, University of Kent, Canterbury, UK.
3. "Orthogonal Polynomial Seeding for the Digital Repository of Mathematical Formulae," H. S. Cohl, January 7, 2016. Joint Mathematics Meetings, Seattle, WA, U.S.A.
4. "Overview of Digital Mathematics Libraries and the NIST Digital Repository of Mathematical Formulae," H. S. Cohl, June 4, 2015. 13^{th} International Symposium on Orthogonal Polynomials, Special Functions and Applications, NIST, Gaithersburg, MD, U.S.A.
5. "UWB Signal Processing: Projection, B-Splines, and Modified Gegenbauer Bases," S. Casey and H. S. Cohl, May 25, 2015. The 11th Conference on Sampling Theory and Applications, American University, Washington D.C., U.S.A.

6. "Newtonian Potential Theory and Superintegrability on Hyperspheres," H. S. Cohl, May 11, 2015. International Conference on Orthogonal Polynomials and q-Series, University of Central Florida, Florida, U.S.A.
7. "Newtonian Potential Theory on Hyperspheres," H. S. Cohl, December 4, 2014. International Conference on Applied Mathematics, in honour of Professor Roderick S. C. Wong's 70^{th} birthday, City University of Hong Kong, Hong Kong, China.
8. "Generalizations of generating functions for hypergeometric and q-hypergeometric orthogonal polynomials," H. S. Cohl, December 1, 2014. International Conference on Applied Mathematics, in honour of Professor Roderick S. C. Wong's 70^{th} birthday, City University of Hong Kong, Hong Kong, China.
9. "Outgrowths of the Digital Library of Mathematical Functions Project," H. S. Cohl and D. Lozier, July 21, 2014. Challenges in 21^{st} Century Experimental Mathematical Computation, Institute for Computational and Experimental Research in Mathematics (ICERM), Providence, Rhode Island.
10. "Generalizations of generating functions for hypergeometric and q-hypergeometric orthogonal polynomials," H. S. Cohl, April 11, 2014. Spring Central Sectional Meeting of the American Mathematical Society, Texas Tech University, Lubbock, Texas.
11. "Hypergeometric orthogonal polynomial expansions," H. S. Cohl, March 28, 2013. 12^{th} International Symposium on Orthogonal Polynomials, Special Functions and Applications, Sousse, Tunisia.
12. "Generalized expansions and definite integrals for hypergeometric orthogonal polynomials," H. S. Cohl, January 12, 2013. Joint Mathematics Meetings, San Diego, California, U.S.A.
13. "Super expansions and definite integrals for Jacobi, Gegenbauer, Legendre and Chebyshev polynomials," H. S. Cohl, June 14, 2012. International Symposium on Orthogonal Polynomials and Special Functions – A Complex Analytic Perspective, Copenhagen, Denmark.
14. "Logarithmic Fourier series for a fundamental solution of the polyharmonic equation in even-dimensional Euclidean space," H. S. Cohl, September 2, 2011. 11^{th} International Symposium on Orthogonal Polynomials, Special Functions and Applications, Leganés, Madrid, Spain.
15. "Radial fundamental solutions of Laplace's equation on Riemannian spaces of constant curvature," H. S. Cohl, August 16, 2011. Special Functions and Orthogonal Polynomials of Lie Groups and their Applications, Děčín, Czech Republic.
16. "Parameter differentiation for Bessel and associated Legendre functions," H. S. Cohl, April 7, 2011. International Conference on Special Functions in the 21^{st} Century: Theory and Applications, Washington, D.C.
17. "Closed Form Expressions and Fourier Expansions for a Fundamental Solution of Laplace's Equation in the Hyperboloid model of Hyperbolic Geometry," H. Cohl and E. Kalnins, 2009. New Zealand Mathematics Colloquium 2009, December 8-10, 2009, Massey University - Albany, Auckland, New Zealand.
18. "Fourier Expansions of a Fundamental Solution for Powers of the Laplacian in $\mathbf{R}^n$," H. S. Cohl and A. F. M. ter Elst, 2007, Joint Meeting of the AMS-NZMS 2007 incorporating the New Zealand Mathematics Colloquium 2007, December 12-15, 2007, Victoria University of Wellington, New Zealand.
19. "The Proper Treatment of Linear Inhomogeneity in 3–Space and 1–Time," H. S. Cohl, 2003, Proceeding of the Fifth International Conference of Symmetry in Nonlinear Mathematical Physics, June 23–29, 2003, Institute of Mathematics, National Academy of Sciences of Ukraine, Kyiv, Ukraine.
20. "Djehuty: A Code for Modeling Whole Stars in Three Dimensions," S. Turcotte, G. Bazan, J. Castor, R. Cavallo, H. Cohl, K. Cook, D. S. P. Dearborn, D. Dossa, R. Eastman, P. P. Eggleton, P. Eltgroth, S. Keller, S. Murray, and A. Taylor, 2002, Radial and Nonradial Pulsations as Probes of Stellar Physics, ASP, Vol. 259 Edited by Aerts, Bedding, Christensen–Dalsgaard. IAU Colloquium 185. San Francisco: ASP, Vol. 202, p. 72.
21. "Djehuty: A 3D Hydrodynamic Stellar Evolution Code," D. S. P. Dearborn, G. Bazan, J. Castor, R. Cavallo, H. Cohl, K. Cook, D. Dossa, R. Eastman, P. P. Eggleton, P. Eltgroth, S. Keller, S. Murray, A. Taylor, and S. Turcotte, 2001, American Astronomical Society Meeting 198.

22. "VSIPL/ERI: Enhanced Reference Implementation of the Core VSIPL Library," A. Skjellum, G. Boudreaux, T. Campbell, W. Shackelford, and H. Cohl, 2001, 5th Annual High Performance Embedded Computing (HPEC) Workshop 2001.
23. "A Heterogeneous Computing Environment to Simulate Astrophysical Fluid Flows," John E. Cazes, Joel E. Tohline, Howard S. Cohl, and Patrick M. Motl, 1999, Proceedings of the DoD User's Group Conference 1999, Monterey, California, June 1999.
24. "An Efficient Means of Determining the Newtonian Potential for Highly Flattened Mass Distributions," Howard S. Cohl. 1999, (Dissertation presentation). 194th (Centennial) AAS Meeting, Chicago, Illinois, May 30–June 3, 1999.
25. "An Extraordinarily Compact Cylindrical Green's Function Expansion for the Solution of Potential Problems," Howard S. Cohl and Joel E. Tohline, 1998, *Bull. Amer. Astron. Soc.* **30**, No. 4, 1427, 193rd AAS Meeting, Austin, Texas, January 5–9, 1999.
26. "An Efficient Three–Dimensional Poisson Solver for SIMD High–Performance–Computing Architectures," Howard S. Cohl, 1994, Workshop on physics of accretion disks around compact and young stars. LPI (Lunar and Planetary Institute) Technical Report Number 94–03, Part 1.
27. "Dynamic Instabilities in Rotating, Low–Mass Protostars during Early Disk Formation," Shelby Yang, Richard H. Durisen, Howard S. Cohl, James N. Imamura, Joseph Toman, and Jason S. Best, 1991, *Bull. Amer. Astron. Soc.* **22**, 1257, 177th AAS Meeting, Philadelphia, Pennsylvania, January 13–17, 1991, https://doi.org/10.1016/0019-1035(91)90122-A, 1991.
28. "High Time, Resolution H–alpha, Continuum and Hard X–Ray Observations of a White Light Flare," Donald F. Neidig, Alan L. Kiplinger, and Howard S. Cohl, 1990, *Bull. Amer. Astron. Soc.* **22**, 846, 176th AAS Meeting, Albuquerque, New Mexico, June 10–14, 1990.

Invited presentations

1. "Binomial and logarithmic Gegenbauer expansions for the even-dimensional polyharmonic equation," H. S. Cohl, August 7, 2017, Applied and Computational Mathematics Division Seminar Series, National Institute of Standards and Technology, Gaithersburg, MD, U.S.A.
2. "Convergence of Magnus integral addition theorems for confluent hypergeometric functions," H. S. Cohl, June 9, 2017. International Conference on Special Functions: Theory, Computation, and Applications, City University of Hong Kong, Hong Kong, China.
3. "Generalizations of the generating function for Gegenbauer polynomials," H. S. Cohl, November 11, 2016. Analysis Seminar, Department of Mathematical Sciences, University of Wisconsin–Milwaukee, Milwaukee, Wisconsin.
4. "Generalizations of Orthogonal Polynomials in Askey Schemes," H. S. Cohl, April 15, 2014. The Department of Mathematics and Statistics Colloquium, Department of Mathematics and Statistics, American University, Washington DC.
5. "Fourier and Gegenbauer expansions of a fundamental solution of Laplace's equation on Riemannian spaces of constant curvature," H. S. Cohl, April 4, 2013. Clifford Analysis Seminar, Department of Mathematical Analysis, Ghent University, Gent, Belgium.
6. "Fourier and Legendre expansions for Green's functions of elliptic PDEs," H. S. Cohl, March 13, 2013. United States Army Research Laboratory, Adelphi, Maryland.
7. "Generalizations of generating functions for hypergeometric orthogonal polynomials," H. S. Cohl, February 21, 2013. Department of Mathematics Special Seminar, Tulane University, New Orleans, Louisiana.
8. "Expansions for the iterated Poisson equation on d-dimensional Euclidean space," H. S. Cohl, December 7, 2012. Department of Mathematical Sciences Colloquium, George Mason University, Fairfax, Virginia.
9. "Generalizations of generating functions for hypergeometric orthogonal polynomials," H. S. Cohl, October 16, 2012. The Norbert Wiener Center Seminar, The Norbert Weiner Center for Harmonic Analysis, University of Maryland, College Park, Maryland.

10. "Simplifications and generalizations of generating functions for hypergeometric orthogonal polynomials with definite integrals," H. S. Cohl, September 28, 2012. Analysis Seminar, Department of Mathematical Sciences, University of Wisconsin–Milwaukee, Milwaukee, Wisconsin.
11. "The Fourier and Gegenbauer analysis of fundamental solutions for Laplace's equation on Riemannian spaces of constant curvature," H. S. Cohl, August 14, 2012. Harmonic Analysis Seminar, Department of Mathematics, Louisiana State University, Baton Rouge, Louisiana.
12. "Fourier, Gegenbauer and Jacobi expansions," H. S. Cohl, March 20, 2012. The Department of Mathematics and Statistics Colloquium, Department of Mathematics and Statistics, American University, Washington DC.
13. "Addition theorems in separable coordinate systems for fundamental solutions," H. S. Cohl, March 2, 2012. Departmental Colloquium, Department of Mathematical Sciences, University of Wisconsin–Milwaukee, Milwaukee, Wisconsin.
14. "Fourier, Gegenbauer, and Jacobi expansions related to a fundamental solution of the polyharmonic equation," H. S. Cohl, October 25, 2011. Applied & Computational Mathematics Division Seminar Series, ITL, NIST, Gaithersburg, Maryland.
15. "Fourier, Gegenbauer, and Jacobi expansions related to a fundamental solution of the polyharmonic equation," H. S. Cohl, October 7, 2011. Departmental Colloquium, Department of Mathematical Sciences, University of Wisconsin–Milwaukee, Milwaukee, Wisconsin.
16. "The Fourier and Gegenbauer analysis of fundamental solutions for the Laplace equation on Riemannian spaces of constant curvature," H. S. Cohl, October 7, 2011. Analysis Seminar, Department of Mathematical Sciences, University of Wisconsin–Milwaukee, Milwaukee, Wisconsin.
17. "The Fourier and Gegenbauer analysis of fundamental solutions for the polyharmonic equation on Riemannian spaces of constant curvature," H. S. Cohl, September 9, 2011. Atomic Physics Division, Department of Atomic Physics and Luminescence, Gdańsk University of Technology, Gdańsk, Poland.
18. "Fourier and Gegenbauer expansions for fundamental solutions of the Laplacian and powers in $\mathbf{R}^d$ and $\mathbf{H}^d$," H. S. Cohl, A. F. M. ter Elst, D. Dominici, July 9, 2010. University of Waikato, Hamilton, New Zealand.
19. "Fourier Expansions of a Fundamental Solution for Powers of the Laplacian in $\mathbf{R}^n$," H. S. Cohl, December 3, 2008. Seminar on Pure Mathematics, Department of Mathematics, The Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong.

Service

- **Editor** of the The Ramanujan Journal (December 2017-*present*).
- **Co-Editor** of OP-SF NET, The Electronic News Net of the SIAM Activity Group on Orthogonal Polynomials and Special Functions (February 2015-*present*).
- **Guest Editor** of Symmetry, Special Issue on Symmetry in Special Functions and Orthogonal Polynomials, 2019.
- **Co-Organizer** for Special Session on Special Functions and Orthgonal Polynomials, 2nd International Conference on Symmetry, September 1-7, 2019, Benasque, Spain.
- **Guest Editor** of Symmetry, Integrability and Geometry: Methods and Applications, Special Issue on Orthogonal Polynomials, Special Functions and Applications, 2016.
- **Co-Organizer** for OPSF-S6, the 6th Summer School on Orthogonal Polynomials and Special Functions (an OPSFA event), Norbert Wiener Center for Harmonic Analysis and Applications, University of Maryland, College Park, MD, U.S.A., July 11-15, 2016.
- **Member** of Scientific Organizing Committee for the 13th International Symposium on Orthogonal Polynomials, Special Functions and Applications, Washington D.C., June 1-5, 2015.
- **Co-Organizer** of 2008 New Zealand Mathematics and Statistics Postgraduate Conference (NZMASP 2008) held in Whitianga, Coromandel Peninsula, New Zealand from November 18-21, 2008.
- **Member** of Program Committee, CICM 2019 (12th Conference on Intelligent Computer Mathematics), July 8-12, 2019, Prague, Czech Republic; Systems and Projects track, Chair: Claudio Sacerdoti Coen.

- **Member** of Program Committee, CICM 2018 (11^{th} Conference on Intelligent Computer Mathematics), August 13-17, 2018, RISC, Hagenberg, Austria; Systems and Projects track, Chair: Abdou Youssef.
- **Referee** for the following journals: Advances in Computational Mathematics, Applied Mathematics and Computation, Astronomy and Astrophysics, Bulletin of Mathematical Analysis and Applications, Complex Variables and Elliptic Equations, Electronic Journal of Differential Equations, Integral Transforms and Special Functions, Journal of the Australian Mathematical Society, Journal of Mathematical Analysis and Applications, Journal of Mathematical Physics, Physica Scripta, Proceedings of the American Mathematical Society, Proceedings of the Royal Society of London. Series A, Radiation Physics and Chemistry, The Ramanujan Journal, SIAM Journal on Scientific Computing, Symmetry, Integrability and Geometry: Methods and Applications.
- **Reviews**: Mathematical Reviews/MathSciNet, Zentralblatt MATH/zbMATH.

Advisor for NIST Summer Undergraduate Research Fellowship Program

- **Thinh H. Dang**, *Fundamental Solutions for the Helmholtz Equation in Riemanninan Spaces of Constant Curvature*, Department of Mathematics and Statistics, American University, Washington, DC, 2015.
- **Isabelle C. Berger**, *Orthogonal Polynomial Generating Functions Verification Using Symbolic Methods*, Department of Mathematics, George Washington University, 2015.
- **Catherine E. Traini**, *Orthogonal Polynomial Generating Functions Verification Using Symbolic Methods*, Department of Mathematics, Hood College, 2015.
- **Jessie Hirtenstein**, *Addition theorems for fundamental solutions of elliptic partial differential equations in special coordinate systems*, Department of Mathematics and Statistics, American University, Washington, DC, 2014.
- **Brandon Alexander**, *R-separation of variables of Laplace's equation in rotationally invariant cyclidic coordinate systems*, Department of Mathematics and Statistics, University of Maryland Baltimore County, Baltimore, MD, 2014.
- **Rebekah M. Palmer**, *Fourier and Gegenbauer expansions for a fundamental solution of Laplace's equation in hyperspherical geometry* and *dual Bessel function definite integrals using the method of integral transforms*, Department of Mathematics, Johns Hopkins University, Baltimore, MD, 2013.
- **Janelle C. Williams**, *Digital Repository of Mathematical Formulae*, Department of Mathematics and Computer Science, Virginia State University, Petersburg, VA, 2013.
- **Michael A. Baeder**, *Generalizations of generating functions for hypergeometric orthogonal polynomials in the Askey scheme*, Department of Mathematics, Harvey Mudd College, Claremont, CA, 2013.
- **Connor MacKenzie**, *Simplifications and generalizations of generating functions for classical orthogonal polynomials with definite integrals*, Department of Mathematics, Westminster College, New Wilmington, PA, 2012.

ACMD Summer High School and Volunteer Internship Advisees

HS = High School; PHS = Poolesville HS, Poolesville, MD; CHS = Clarksburg HS, Darnestown, MD; MBHS = Montgomery Blair HS, Silver Spring, MD; RMHS = Richard Montgomery HS, Rockville, MD; CHFHS = Charles Herbert Flowers HS, Springdale, MD; CZMHS = Colonel Zadok Magruder HS, Rockville, MD; NWH = Northwest HS, Germantown, MD; QOHS = Quince Orchard HS, Darnestown, MD; TWHS = Thomas Wooton HS, Rockville, MD.

- **Jason Zhao**, *Linearization Formulae Generalization for (Basic) Hypergeometric Orthogonal Polynomials*, RMHS, 3/'17-*present*.
- **Derek Yao**, *Traceability of DLMF Formulae*, RMHS, 2-8/'17.
- **Sahil Sinha**, *RDF Framework for DRMF home pages*, PHS, 2-8/'17.
- **Kaitlyn Yang**, *Extraction of Formulae from DLMF 2D Tables*, PHS, 2-8/'17.
- **Jonathan Lin**, *Traceability of DLMF Formulae*, RMHS, 2-6/'17.
- **Andrew Mao**, *DRMF Formula Output Format Implementation*, RMHS, 2-6/'17.
- **Amanda Hu**, *Verifying Traceability to Proofs Literature Search for DLMF*, PHS, 2/'16-6/'17.
- **Nina Tang**, *Verifying Traceability to Proofs Literature Search for DLMF*, PHS, 2/'16-6/'17.
- **Claude Zou**, *Semantic LaTeX Mathematical Operator Macro Replacement for DRMF*, PHS, 6/'15-6/'17.

- **Ananya Krishnan**, *Traceability of DLMF Formulae*, RMHS, 2-6/'17.
- **Jeff Tran**, *Traceability of DLMF Formulae*, RMHS, 2-6/'17.
- **Parth Oza**, *MediaWiki Formula Search for DRMF*, PHS, 5/'16-6/'17.
- **Kevin Shen**, *Java Mathematical OCR Ground Truth Engine for DRMF*, PHS, 2/'16-6/'17.
- **Edward Bian**, *Python Automated KLSadd insertion into KLS dataset for DRMF*, PHS, 2/'16-6/'17.
- **Philip Wang**, *Python Semantic LaTeX and MediaWiki Wikitext Conversion for DRMF*, PHS, 3/'16-6/'17.
- **Kevin Chen**, *Python and PHP Wolfram and Semantic LaTeX for DRMF*, PHS, 2/'16-6/'17.
- **Joon Bang**, *Python and PHP Maple and Semantic LaTeX for DRMF*, PHS, 2/'16-6/'17.
- **Naveen Raman**, *Generalizations of the Linearization Formula for Laguerre Polynomials*, RMHS, 2-6/'17.
- **Jagan Prem**, *Semantic LaTeX Mathematical Operator Macro Replacement for DRMF*, PHS, 2/'16-5/'17.
- **Tanay Wakhare**, *Sums involving the number of distinct prime factors function*, QOHS, 7/'15-8/'16.
- **Oksana Tkach**, *Python DLMF Seeding for DRMF*, PHS, 2-8/'16.
- **Justin Park**, *Mathematical Analysis of Special Functions and Orthogonal Polynomials*, PHS, 2-8/'16.
- **Seong Joon Yoo**, *Java Mathematical Optical Character Recognition Layout for DRMF*, PHS, 2-8/'16.
- **Sourabh Vellala**, *Python DLMF Seeding for DRMF*, PHS, 2-8/'16.
- **Zach Fink**, *Newtonian Density-Potential Pairs in Hyperbolic Geometry*, CHS, 12/'15-8/'16.
- **Rahul Shah**, *Python Automated KLSadd insertion into KLS dataset for DRMF*, CHS, 11/'15-8/'16.
- **Grace Tang**, *Verifying Traceability to Proofs Literature Search for DLMF*, PHS, 2-7/'16.
- **Yash Kapoor**, *Literature Search for Formulas in Koekeok, Lesky and Swarttouw*, CHS, 6/'15-7/'16.
- **William (Wenqing) Xu**, *Generalized generating functions for hypergeometric orthogonal polynomials in the Askey and q-Askey schemes*, Mathematics HS Volunteer, MBHS, 6/'14-9/'15.
- **Hannah Cohen**, *Literature Search for Formulas in the DLMF*, CZMHS, 6-8/'15.
- **Akash Shah**, *Front-End Search Development for the DRMF*, **SHIP**, NHS, 6-8/'15.
- **Yusuf Ameri**, *DRMF development*, QOHS, 6-8/'15.
- **Jimmy J. Li**, *Keyword based and XML comparison based math search over large data sets*, **SHIP**, RMHS, 6/'14-8/'15.
- **Azeem Mohammed**, *Wikitext Generation using Semantic LaTeX*, PHS, 8/'14-6/'15.
- **Divya Gandla**, Mathematica *to LaTeX DRMF mathematics conversion for* eCF *dataset*, PHS, 11/'14-6/'15.
- **Shraeya Madhu**, *DLMF Seeding in the DRMF*, PHS, 8/'14-7/'15.
- **Sean J. Nair**, *Dual Bessel Function Integrals*, MBHS 1-6/'15.
- **Neil Agrawal**, *DLMF Chapter Proof-Data Research and Verification*, PHS, 2-6/'15.
- **Nina Agrawal**, *DLMF Chapter Proof-Data Research and Verification*, PHS, 2-6/'15.
- **Sabrina Zhou**, *Orthogonal Polynomial Literature Search and Data Mining*, MBHS, 12/'14-6/'15.
- **Cherry Zou**, *Python macro generation for DRMF orthogonal polynomial KLS and Koornwinder KLS addendum LaTeX documents*, DRMF HS Volunteer, PHS, 1/'14-5/'15.
- **Ankita Sharma**, *Conversion from Semantic LaTeX to Mathematica Source*, PHS, 11/'14-5/'15.
- **Alex Danoff**, *Python DLMF Macro replacement, DLMF processing scripting, and DLMF metadata extraction*, DRMF HS Volunteer, TWHS, 6-8/'14.
- **Amber Liu**, *Macro generation for DRMF and MathJax semantic LaTeX output*, DRMF HS Volunteer, PHS, 1-8/'14.
- **Jacob Migdall**, *Macro generation for DRMF and MathJax semantic LaTeX output*, DRMF HS Volunteer, PHS, 1-6/'14.
- **Kathleen Arnett**, *Macro generation for DRMF*, DRMF HS Volunteer, RMHS, 1-6/'14.
- **Teddy Corrales**, *Macro generation for DRMF*, DRMF HS Volunteer, MBHS, 1-6/'14.
- **Michael Vetter**, *Macro generation for DRMF*, DRMF HS Volunteer, PHS, 1-3/'14.
- **Diamond Smith**, *Macro generation for DRMF*, DRMF HS Volunteer, CHFHS, 1-3/'14.
- **Philbert R. Hwang**, *Generalizations of generating functions for basic hypergeometric orthogonal polynomials in the q-Askey scheme*, **SHIP**, PHS, 6-8/'13.