Charles F. Doran: Professional Preparation

Harvard College	Mathematics, A.B. 1992
Harvard University	Mathematics, A.M. 1993
Harvard University	Mathematics, Ph.D. 1999
The Pennsylvania State University	S. Chowla Research Postdoctoral Fellow, 1999–2000
Columbia University	VIGRE/Ritt Assistant Professor, 2000–2004

Charles F. Doran: Appointments

- Assistant Professor of Mathematics, University of Washington, September 2003–present.

- VIGRE/Ritt Assistant Professor of Mathematics, Columbia University, August 2000–August 2004.

- S. Chowla Research Postdoctoral Fellow, The Pennsylvania State University, July 1999–July 2000.

Charles F. Doran: Most Relevant Publications

- *On Graph-Theoretic Identifications of Adinkras, Supersymmetry Representations and Superfields.* With Michael Faux, Jim Gates, Tristan Hübsch, Kevin Iga, & Greg Landweber. International Journal of Modern Physics A, Vol. 22, No. 5 (2007) 869-930.

- *Off-Shell Supersymmetry and Filtered Clifford Supermodules.* With Michael Faux, Jim Gates, Tristan Hübsch, Kevin Iga, & Greg Landweber. (arXiv: math-ph/0603012) Submitted for publication.

- *Adinkras and the Dynamics of Superspace Prepotentials.* With Michael Faux, Jim Gates, Tristan Hübsch, Kevin Iga, & Greg Landweber. (arXiv: hep-th/0605269) To appear in Advanced Studies in Theoretical Physics.

- *A Counter-Example to a Putative Classification of 1-Dimensional, N-extended Supermultiplets.* With Michael Faux, Jim Gates, Tristan Hübsch, Kevin Iga, & Greg Landweber. (arXiv: hep-th/0611060) To appear in Advanced Studies in Theoretical Physics.

- *On the Matter of N=2 Matter.* With Michael Faux, Jim Gates, Tristan Hübsch, Kevin Iga, & Greg Landweber. To appear in Physics Letters B.

Charles F. Doran: Other Publications

- *Picard-Fuchs Uniformization and Modularity of the Mirror Map*, Communications in Mathematical Physics, 212 (2000) 625-647.

- *Algebraic and Geometric Isomonodromic Deformations.* Journal of Differential Geometry 59 (2001) 33-85.

- *On K3 Surfaces with Large Complex Structure.* With Adrian Clingher, Advances in Mathematics, 215 (2007) 504-539.

- *Algebraic Topology of Calabi-Yau Threefolds in Toric Varieties.* With John Morgan. Geometry and Topology, 11 (2007) 597-642.

- *Families of Quintic Calabi-Yau 3-Folds with Discrete Symmetries.* With Brian Greene and Simon Judes. To appear in Communications in Mathematical Physics.

Synergistic Activities: (a) Postdoctoral Scholars and Graduate Students: The PI is the faculty sponsor for VIGRE postdoctoral scholar, Aravind Asok, December 2005–present. The PI co-supervised UW physics postdoctoral scholar Chris Herzog (now on the faculty at Princeton), August 2005–July 2007; they wrote one joint paper during this time. The PI's four graduate students are actively involved in his research and education activities in Seattle. Under his direction they are co-organizing the new Physics Learning Graduate Seminar. The PI is writing papers with his students Jacob Lewis and Ursula Whitcher, and supervised his student Andrey Novoseltsev's project to integrate the Package for Analyzing lattice Polytopes (PALP) into William Stein's SAGE computer algebra system. The PI's graduate students Matt Ballard and Ursula Whitcher and postdoctoral scholar Chris Herzog attended the BIRS workshop he organized in June 2006 on "Modular Forms and String Dualities".

(b) Undergraduate Students: The PI ran a summer 2004 VIGRE undergraduate research project with five Columbia undergraduates and two graduate students on "Reflexive Polytopes, Toric Geometry, and String Duality". This project continued in Seattle during summer 2005 with returning Columbia Rabi Scholar Arthur Popa (now in the mathematics Ph.D. program at SUNY Stonybrook). The PI supervised three senior theses while at Columbia, and one so far at UW. These undergraduates are all now in graduate school: Chris Miller in physics at Columbia, Jacob Lewis in mathematics at UW, Spencer Greenberg in mathematics at NYU, and Noah Giansiracusa in mathematics at Brown. Each is a US citizen. The PI has applied for an NSF-CSUMS grant as co-PI with William Stein on "Undergraduate Computational Research in Arithmetic Geometry."

(c) High School Students, Public Lectures, and Outreach: The PI featured the mathematics of 2D reflexive polytopes in interactive lectures with talented high school students at the Research Science Institute (RSI) at Caltech during the summer of 2004, at the Summer Institute for Mathematics at the University of Washington (SIMUW) over both summer 2004 and summer 2005, and at the 2006 University of Washington Math Day event. The PI also mentored two Stuyvesant High School students' Intel Science Talent Search projects. One of these students subsequently attended Harvard College; the other was a semi-finalist in the competition. The PI frequently presents the exciting developments at the interface of string theory and mathematics to non-specialist audiences and the interested public. This includes the VIGRE lecture in Seattle "Why are mathematicians so excited about string theory?" (December 2003), colloquia at Iowa State University, the University of Oregon, and the University of Missouri on "String Theory and Mathematics," and a Science Forum Colloquium lecture of the same name at the University of Washington (May 2005).

Charles F. Doran: Collaborators and Other Affiliations: (a) Coauthors: A. Clingher (Missouri), M. Faux (SUNY), J. Gates (Maryland), B. Greene (Columbia), M. Headrick (Brandeis), C. Herzog (Princeton), S. Hosono (Tokyo), T. Hübsch (Howard/DSU), K. Iga (Pepperdine), S. Judes (Columbia), J. Kantor (UW), G. Landweber (Bard), J. Lewis (UW), J. Morgan (Columbia), U. Whitcher (UW), T. Wiseman (Imperial).

(b) Graduate and Postdoctoral Advisors: *Ph.D.:* B. Mazur and S.-T. Yau (Harvard). *Postdoctoral:* J.-L. Brylinski (PSU), B. Greene and J. Morgan (Columbia).

(c) Thesis Students: Advisor of **four** Ph.D. theses: UW graduate students Matthew Ballard, Ursula Whitcher, Jacob Lewis, and Andrey Novoseltsev. Currently supervises **one** postgraduate-scholar in mathematics at UW: Aravind Asok, 2004 Ph.D., Princeton University.

Michael Rubinstein, Biographical Sketch

A. Professional Preparation

Ph.D.	Mathematics, Princeton University, June 1998, *Evidence for a spectral interpretation of the zeros of L-functions.*
M.A.	Mathematics, Princeton University, June 1996.
B.A.	Mathematics, Princeton University, June 1994.

B. Appointments

2008–	Associate Professor, University of Waterloo.
2003–2007	Assistant Professor, University of Waterloo.
2003–current	Researcher (part time), American Institute of Mathematics.
Feb-April 2004	Senior Visiting Fellow, Isaac Newton Institute, Cambridge, UK.
2001–2003	Postdoc, American Institute of Mathematics, Palo Alto, California.
1999–2001	R.H. Bing Postdoc, The University of Texas at Austin.
1998–1999	Postdoc, Mathematical Sciences Research Institute, Berkeley, Califronia.
1998–1999	Postdoc, Hewlett-Packard, Palo Alto, California.
1994	Intern (Summer), AT&T Bell Laboratories, Morgan Hill, New Jersey.

C. Publications

5 publications most closely related to this proposal

1. *Computational methods and experiments in analytic number theory.* Recent Perspectives in Random Matrix Theory and Number Theory, London Mathematical Society Lecture Note Series **322** (2005), editors, F. Mezzadri and N. C. Snaith, Cambridge University Press, 425–506.
2. *Integral moments of zeta- and L-functions*, with B. Conrey, D.W. Farmer, J.P. Keating, and N.C. Snaith. Proceedings of the London Mathematical Society, **91** (2005), 33–104.
3. *Low lying zeros of L-functions and random matrix theory.* Duke Mathematical Journal **109** (2001), no. 1, 147–181.
4. *Random matrix theory and the Fourier coefficients of half-integral weight forms*, with J.B. Conrey, J.P. Keating, and N.C. Snaith, Experimental Mathematics, **15** (2006), no. 1, 67–82.
5. *Secondary terms in the number of vanishings of quadratic twists of elliptic curve L-functions*, with J.B. Conrey, A. Pokharel, and M. Watkins, Proceedings of Ranks of Elliptic Curves and Random Matrix, Cambridge University Press, 15 pages, 2007.

5 other significant publications

6. *Lower order terms in the full moment conjecture for the Riemann zeta function*, with J.B. Conrey, D.W. Farmer, J.P. Keating, and N.C. Snaith, 30 pages, accepted by the Journal of Number Theory.
7. *Moments of the derivative of the Riemann zeta-function and of characteristic polynomials*, with J.B. Conrey, and N.C. Snaith, Communications in Mathematical Physics, **267** (2006), no. 3, 611–629.
8. *On the frequency of vanishing of quadratic twists of modular L-functions*, with J.B. Conrey, J.P. Keating, and N.C. Snaith. Proceedings of the Millennial Conference on Number Theory, editor, B.C. Berndt et al. A.K. Peters, Ltd, Boston **1** (2001), 301–316.
9. *Zeros of Dirichlet L-functions near the real axis and Chebyshev's bias*, with Carter Bays, Kevin Ford, Richard Hudson. Journal of Number Theory **87** (2001), no. 1, 54–76.
10. *Chebyshev's bias*, with Peter Sarnak. Experimental Mathematics **3** (1994), no. 3, 173–197.

D. Synergistic Activities

Software   Author of the L-function calculator, a `C++` class library and command line interface for computing zeros and values of L-functions. Available at `www.math.uwaterloo.ca/∼mrubinst`.

Database   Computed and made available, via the internet, the classical modular polynomials that arise in elliptic curve cryptography.

Conferences   Co-organizer for: Canadian Number Theory Association - tenth meeting, Waterloo (2008), L-functions and modular forms, American Insititute of Mathematics (2007), L-functions, ranks of elliptic curves, and random matrix theory, Banff (2007), CMS number theory session, University of Waterloo (2005), AMS session on computational number theory, Boulder, Colorado (2003).

Wiki   Co-founder and co-administrator for the new L-functions and Modular Forms Wiki, August 2007, `L-functions.org:9000`

Outreach   Instructor for Bay Area Math Circles, 2001-2003.

E. Collaborators & Other Affiliations

(i) *Recent collaborators.*
     Brian Conrey, American Institute of Mathematics.
     David Farmer, Bucknell University.
     John Keating, Bristol Research Institute in the Mathematical Sciences
     Nina Snaith, University of Bristol.
     Mark Watkins, University of Bristol.

(ii) *Graduate and postgraduate advisors.*
     Peter Sarnak (thesis advisor and co-author), Department of Mathematics, Princeton University.

(ii) *Thesis supervision.*
     2007–, Y. Shuntaro, Masters student, University of Waterloo.
     2006–, R. Rishikesh, PhD student, University of Waterloo.

BIOGRAPHICAL SKETCH
Birne Binegar

PERSONAL INFORMATION

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	Oklahoma State University
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PROFESSIONAL PREPARATION

B.S.,	University of California, Los Angeles, September 1977,
	Major: Physics
M.S.,	University of California, Los Angeles, June 1979,
	Major: Physics
Ph.D.,	University of California, Los Angeles, December 1982,
	Major: Physics,

PROFESSIONAL POSITIONS

1993–	Associate Professor of Mathematics, Oklahoma State University, Stillwater, OK
1988–1993	Assistant Professor of Mathematics, Oklahoma State University, Stillwater, OK
1988	Postdoctoral Fellow, Mathematical Sciences Research Institute, Berkeley, CA
1987–1988	Adjunct Professor, Palomar College, San Marcos, CA
1986–1987	Postdoc, International School for Advanced Studies (S.I.S.S.A.), Trieste, Italy
1985–1986	NSF-CNRS Research Fellow, Université de Dijon, Dijon, France
1984–1985	Visiting Lecturer and Assistant Research Physicist, UCLA, Los Angeles, CA
1982–1984	Monbusho Research Fellow, Research Institute for Mathematical Sciences, Kyoto, Japan

RELEVANT PAPERS

- On a family of multiplicity-free $K_{\mathbb{C}}$-orbits, Preprint August, 2006 (`arXiv:math.RT/0608167`, http://arxiv.org/abs/math.RT/0608167). (accepted for publication by J. of Math. of Kyoto Univ.)
- Unitarization of a Singular Representation of $SO(p,q)$, (with R. Zierau), *Comm. Math. Phys.* **138**, 245-258 (1991).
- A Singular Representation of E_6, (with R. Zierau), (with R. Zierau), *Trans. Am. Math. Soc.*, **341**, 771-785 (1994).
- Relativistic Field Theories in Three Dimensions, *J. Math. Phys.* **23**, 1511 (1982).

OTHER SIGNIFICANT PAPERS

- Linear Conformal Quantum Gravity, (with C. Fronsdal and W. Heidenreich), *Phys. Rev.* **D27**, 2249-2261 (1983).
- On the Unitarity of Conformal Supergravity, *Phys. Rev.* **D31**, 2497-2502 (1985).
- Conformal Superalgebras, Massless Representations and Hidden Symmetries, *Phys. Rev.* **D34**, 525-532 (1986).
- Cohomology and Deformations of Lie Superalgebras, *Lett. Math. Phys.* **12**, 301-308 (1987).

SYNERGISTIC ACTIVITIES

- Faculty Director of the Mathematics Learning Resource Center, Oklahoma State University, 1996-1997
- Authored LieTools, a Maple package for studying simple Lie algebras and their representations
- Principal Investigator for 1998 NSF SCREMS grant that provided a computational server for the Department of Mathematics at Oklahoma State University
- Member, Atlas for Lie Groups and Representations FRG, DMS 0554278

COLLABORATORS AND OTHER AFFILIATIONS

- **Graduate and Postdoctoral Advisors:**
  - Christian Frondsdal, Department of Physics, UCLA (thesis advisor)
  - Huzihiro Araki, sponsor, Monbusho Research Fellowship
    Research Institute for Mathematical Sciences, Kyoto University
  - Moshe Flato, sponsor, NSF-CNRS Research Fellowship, Université de Dijon
- **Coauthors:**
  C. Frondal (UCLA), R. Zierau (Oklahoma State Univ.),

Biographical Sketch

William Stein

- Email: wstein@gmail.com
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- Phone: 206-419-0925

Professional Preparation

Northern Arizona University	Mathematics, B.S. 1994
University of California at **Berkeley**	Mathematics, Ph.D. 2000
Harvard University	Postdoc, 2000–2005

Appointments

- Associate Professor of Mathematics (with tenure), University of Washington, September 2006–present.
- Associate Professor of Mathematics (with tenure), UC San Diego, July 2005–June 2006.
- Benjamin Peirce Assistant Professor of Mathematics, Harvard University, July 2001–May 2005.
- NSF Postdoctoral Research Fellowship under Barry Mazur at Harvard University, August 2000–May 2004.
- Clay Mathematics Institute Liftoff Fellow, Summer 2000.

Most Relevant Publications

- *Average Ranks of Elliptic Curves: Tension Between Data and Conjecture*, with B. Bektemirov, B. Mazur, W. Stein, and M. Watkins, Bulletins of the AMS **44** (2007), no. 2, 233–254.
- *Modular forms, a computational approach* (xvi+268 pp.) Graduate Studies in Mathematics (AMS) 79 2007, with an appendix by Paul Gunnells.
- *Verification of the Birch and Swinnerton-Dyer Conjecture for Specific Elliptic Curves*, with G. Grigorov, A. Jorza, S. Patrikis, and C. Patrascu (26 pages), 2005, to appear in Mathematics of Computation.
- *Computation of p-Adic Heights and Log Convergence*, with B. Mazur and J. Tate (36 pages), Documenta Mathematica, 2006, Extra Vol., 577–614.
- *Visible Evidence for the Birch and Swinnerton-Dyer Conjecture for Rank 0 Modular Abelian Varieties* (31 pages), with A. Agashe, Mathematics of Computation **74** (2005), no. 249, 455–484.

Other Publications

- *The Manin Constant*, with A. Agashe and K. Ribet, Pure Appl. Math., (2006), no. 2., 617–636.
- *Studying the Birch and Swinnerton-Dyer Conjecture for Modular Abelian Varieties Using Magma* (22 pages), a chapter in the Springer–Verlag book "Computational Experiments in Algebra and Geometry".
- *Shafarevich-Tate Groups of Nonsquare Order*, Progress in Math., **224** (2004), 277–289, Birkhauser.
- *Constructing Elements in Shafarevich-Tate Groups of Modular Motives*, (19 pages) with N. Dummigan and M. Watkins, "Number theory and algebraic geometry—to Peter Swinnerton-Dyer on his 75th birthday", Ed. by M. Reid and A. Skorobogatov.
- *$J_1(p)$ has connected fibers*, with B. Conrad and B. Edixhoven, Documenta Math., **8** (2003), 331–408.

Synergistic Activities

- **Research Tools:** Principal author of Sage, which is a major new piece of software. Author of the modular forms, modular symbols and modular abelian varieties parts of the Magma computer algebra system (425 pages (26000 lines) of code plus documentation). These are tools used by mathematicians who do computations with modular forms.
- **Databases:** Created and maintain the Modular Forms Database. This contains continually expanding data about elliptic curves and modular forms: `http://wstein.org/Tables/`.
- **Outside Service:** IDA/CCR consultant. Also, Defense Science Study Group member 2002–2003: DSSG is a DARPA funded program administered by the Institute for Defense Analysis; paper on GPS vulnerabilities.
- **Outreach:** SIMUW 2007; SIMUW 2006; Canada/USA MathCamp mentor (2002); Several Math Circles talks in Boston.

Collaborators and Other Affiliations

- **Coauthors:** A. Agashe (Florida State U.), K. Buzzard (Imperial College, London), R. Coleman (UC Berkeley), B. Conrad (Univ. of Michigan), N. Dummigan (Sheffield, UK), S. Edixhoven (Leiden, Netherlands), F. Leprévost (Univ. Joseph Fourier, Technische Univ. Berlin), E. V. Flynn (Liverpool, UK), D. Kohel (Univ. of Sydney), B. Mazur (Harvard), L. Merel (Paris 6), K. Ribet (UC Berkeley), E. F. Schaefer (Santa Clara Univ.), M. Stoll (Inter. Univ. Bremen, Germany), J. Tate, H. A. Verrill (Louisiana State), M. Watkins (Bristol.), J. L. Wetherell (CCR, San Diego)
- **Graduate and Postdoctoral Advisors:**
  - **Ph.D. advisor:** Hendrik Lenstra, University of Leiden, Netherlands.
  - **NSF Postdoctoral advisor:** Barry Mazur, Harvard University.
- **Thesis Students:** 2 Ph.D. students: Robert Bradshaw's Ph.D. thesis at Univ. of Washington and Ifti Burhanuddin's at Univ. of Southern California. Advised eight undergraduate senior theses at Harvard.