

C.V. for David C. Seal

CONTACT INFORMATION	Department of Mathematics U.S. Naval Academy 572C Holloway Road Annapolis, MD 21402	Voice: +1 (410) 293-6784 E-mail: seal@usna.edu Web: http://www.usna.edu/Users/math/seal/
EDUCATION	PhD - Mathematics, University of Wisconsin-Madison Title: <i>Discontinuous Galerkin Methods for Vlasov Models of Plasma</i> Advisor: James Rossmanith Minor: Computer Science MA - Mathematics, University of Wisconsin-Madison HBS - Mathematics, University of Utah Advisor: Davar Khoshnevisan Minor: Physics	August 2012 May 2009 August 2006
EMPLOYMENT HISTORY	Assistant Professor , US Naval Academy Visiting Researcher , Oakridge National Laboratory Research Associate (postdoc), Michigan State University Summer Student Internship , Lawrence Livermore National Laboratory Graduate Student and Teaching Assistant , University of Wisconsin - Madison	2015 – present Summer 2014 2012 – 2015 Summers 2010, 2011 2006 – 2012
RESEARCH INTERESTS	Numerical analysis, scientific computing, hyperbolic partial differential equations, discontinuous Galerkin and WENO methods, time stepping schemes (semi-Lagrangian, Lax-Wendroff, multiderivative and spectral deferred correction)	
PUBLICATIONS	S. Moe, J.A. Rossmanith, and D.C. Seal, <i>An effective high-order shock-capturing limiter for discontinuous Galerkin methods</i> , (submitted). S. Moe, J.A. Rossmanith, and D.C. Seal, <i>Positivity preserving Lax-Wendroff discontinuous Galerkin methods</i> , (accepted J. Sci. Comput.). A. Jaust, J. Schütz, and D.C. Seal, <i>Implicit multistage two-derivative discontinuous Galerkin schemes for viscous conservation laws</i> , (accepted J. Sci. Comput.). A.J. Christlieb, X. Feng, D.C. Seal, and Q. Tang, <i>A high-order positivity-preserving single-stage single-step method for the ideal magnetohydrodynamic equations</i> , J. Comp. Phys., Volume 316, Pages 218–242, July 2016. M.F. Causley, H. Cho, A.J. Christlieb, and D.C. Seal, <i>Method of lines transpose: High order L-Stable $O(N)$ schemes for parabolic equations using successive convolution</i> , SIAM J. Numer. Anal., 54(3), Pages 1635–1652, 2016. A.J. Christlieb, S. Gottlieb, Z. Grant, and D.C. Seal, <i>Explicit strong stability preserving multistage two-derivative time-stepping schemes</i> , J. Sci. Comput., 68(3) Pages 914–942, 2016. D.C. Seal, Q. Tang, Z. Xu, and A.J. Christlieb, <i>An explicit high-order single-stage single-step positivity-preserving finite difference WENO method for the compressible Euler equations</i> , J. Sci. Comput., 68(1) Pages 171–190, 2016.	

A. Jaust, J. Schütz, and D.C. Seal, *Multiderivative time-integrators for the hybridized discontinuous Galerkin method*, YIC GACM Conference proceedings, 2015.

A.J. Christlieb, Y. Güçlü, and D.C. Seal, *The Picard integral formulation of weighted essentially non-oscillatory schemes*, SIAM J. Numer. Anal., 53(4), 1833–1856, 2015.

D.C. Seal, Y. Güçlü, and A.J. Christlieb, *High-order multiderivative time integrators for hyperbolic conservation laws*, J. Sci. Comput., Volume 60, Issue 1, Pages 101–140, July 2014.

J.A. Rossmannith and D.C. Seal, *A positivity-preserving high-order semi-Lagrangian discontinuous Galerkin scheme for the Vlasov-Poisson equations*, J. Comp. Phys., Volume 230, Issue 16, Pages 6203–6232, July 2011.

INVITED PRESENTATIONS	<i>Applied Math Seminar</i>	Spring 2016
	New Jersey Institute of Technology, Newark, NJ	
	<i>SIAM Conference on Computational Science and Engineering (CSE15)</i>	Spring 2015
	Salt Lake City, UT	
	<i>Computational and Applied Math Seminar</i>	March 2015
	Iowa State University, Ames, IA	
	<i>Math Department Colloquium</i>	February 2015
	United States Naval Academy, Annapolis, MD	
	<i>Math Department Colloquium</i>	February 2015
	Lawrence Technical University, Southfield, MI	
	<i>Math Department Colloquium</i>	January 2015
	Auburn University, Auburn, AL.	
	<i>International Conference on Spectral and High Order Methods (ICOSAHOM 2014)</i>	Summer 2014
	University of Utah, Salt Lake City, UT	
	<i>Air Force Research Laboratory (AFRL) Propulsion Directorate</i>	Summer 2014
Edwards Air Force Base, CA		
<i>Computer Science and Mathematics Division seminar</i>	Spring 2014	
Oakridge National Laboratory, Oakridge, TN		
<i>SIAM Conference on Analysis of Partial Differential Equations (PD13)</i>	Fall 2013	
Lake Buena Vista, FL		
<i>Issues in Solving the Boltzmann Equation for Aerospace Applications</i>	Summer 2013	
ICERM, Brown University, Providence, RI		
<i>American Mathematical Society Spring Central Section Meeting</i>	Spring 2013	
Iowa State University, Ames, IA		
<i>SIAM Conference on Computational Science and Engineering (CSE13)</i>	Spring 2013	
Boston, MA		
<i>Computational Math Seminar</i>	Spring 2012	
University of Colorado, Boulder, CO		
<i>Institute for Scientific Computing Research</i>	Summer 2011	
Lawrence Livermore National Laboratory, Livermore, CA		
CONFERENCE PRESENTATIONS	<i>DelMar Numerics Day</i>	Spring 2016
	George Mason University, Fairfax, VA	
	<i>APS March Meeting</i>	Spring 2016
Baltimore, MD		
<i>Joint Mathematics Meeting</i>	Spring 2016	

Seattle, WA
Applied Mathematics, Modeling and Computational Science (AMMCS 2015) Summer 2015
 Waterloo, Ontario, Canada
SIAM Great Lakes Section Spring 2014
 Grand Rapids, MI
SIAM Annual Meeting (AN13) - Minisymposium Organizer Summer 2014
 Chicago, IL
The 41st IEEE International Conference on Plasma Science (ICOPS 2014) Summer 2014
 Washington, DC
Applied Mathematics, Modeling and Computational Science (AMMCS 2013) Summer 2013
 Waterloo, Ontario, Canada
The 40th IEEE International Conference on Plasma Science (ICOPS 2013) Summer 2013
 San Francisco, CA
The 39th IEEE International Conference on Plasma Science (ICOPS 2012) Summer 2012
 Edinburgh, Scotland
53rd Annual Meeting of the APS Division of Plasma Physics Fall 2011
 Salt Lake City, UT
SIAM Conference on Computational Science and Engineering (CSE11) Spring 2011
 Reno, NV
SIAM Conference on Nonlinear Waves and Coherent Structures (NW10) Summer 2010
 Philadelphia, PA

CONFERENCES AND WORKSHOPS
Air Force Office of Scientific Research (AFOSR) Fall 2016
 Computational Math Annual Program Review
 Arlington, VA
Air Force Office of Scientific Research (AFOSR) Fall 2013
 Computational Math Annual Program Review
 Arlington, VA
Algorithm and Model Verification and Validation For Kinetic Plasma Simulation Codes Fall 2012
 Michigan State University, East Lansing, MI
Computational Methods in High Energy Density Plasmas Spring 2012
 IPAM, UCLA, Los Angeles, CA
Computational Kinetic Transport and Hybrid Methods Spring 2009
 IPAM, UCLA, Los Angeles, CA
Midwest Probability Colloquium Fall 2007
 Northwestern University, Evanston, IL

SERVICE
Reviewer, Advances in Computational Mathematics, Applied Numerical Mathematics, Computers and Fluids, Journal of Scientific Computing, Mathematical Modelling and Analysis, SIAM Journal on Scientific Computing (SISC), and SIAM Journal on Numerical Analysis (SINUM).

TEACHING EXPERIENCE
Lecturer, Michigan State University
 Transitions, an introduction to proof writing, 2 semesters
 Numerical Analysis II (reading course), 1 semester
 Analysis II, 1 semester
 Numerical Analysis I, 1 semester

	Applied Linear Algebra, 1 semester	
	Calculus II, 1 semester	
	Instructor , University of Wisconsin-Madison	2 semesters
	Intermediate Algebra, 1 semester	
	College Algebra, 1 semester	
	Wisconsin Emerging Scholars , University of Wisconsin-Madison	1 semester
	Calculus II, Teaching Assistant	
	Teaching Assistant , University of Wisconsin-Madison	10 semesters
	Business Calculus, 1 semester	
	Calculus with Algebra and Trigonometry, 1 semester	
	Calculus I, TA-Coordinator, 2 semesters	
	Calculus II, 3 semesters	
	Linear Algebra and Differential Equations, 1 semester	
	Introduction to Discrete Mathematics, 1 semester	
	Ordinary Differential Equations, 1 semester	
	Supplemental Instructor , University of Utah	2 semesters
	Intermediate Algebra, 1 semester	
	College Algebra, 1 semester	
	Ndahoo'ah Instructor , Monument Valley High School	1 semester
	University of Utah Outreach Program	
MENTORING	Co-mentor for Ms. Hana Cho, and Mr. Xiao Feng PhD candidates, Michigan State University	2012–present
	Co-mentor for Qi Tang PhD graduate, 2015, Michigan State University Thesis: <i>Development of a fast and accurate time stepping scheme for the functionalized Cahn-Hilliard equation and application to a graphics processing unit</i>	
	Undergraduate reading course Numerical methods for hyperbolic problems	Fall 2014
	Undergraduate reading course Finite difference methods for ordinary and partial differential equations	Spring 2014
	Co-mentor for Jaylan Jones PhD graduate, Michigan State University Thesis: <i>Development of a fast and accurate time stepping scheme for the functionalized Cahn-Hilliard equation and application to a graphics processing unit</i>	Summer 2013
	Co-mentor for P. Ammirato, K. Eichinger, A. Hegedus, C. Ross, R. Vander Stad Research Experience for Undergraduates, Michigan State University Title: <i>An investigation towards embedded boundary methods for Maxwell's equations</i>	Summer 2012
AWARDS AND MINOR GRANTS	Departmental Teaching Award University of Wisconsin-Madison	Spring 2011
	University Housing Honored Instructor Award University of Wisconsin-Madison	Fall 2010, 2011
	NSF VIGRE Fellowship University of Wisconsin-Madison	Summer 2010

	NSF VIGRE Summer Enhancement Program University of Wisconsin-Madison	Summer 2007
PREVIOUS RESEARCH EXPERIENCE	Summer student internship: <i>High-order IMEX time integration techniques</i> Lawrence Livermore National Laboratory, Advisors: M. Dorr, J.A.F. Hittinger.	Summer 2011
	Summer student internship: <i>High-order multirate time integration techniques</i> Lawrence Livermore National Laboratory, Advisors: J.A.F. Hittinger, J.W. Banks.	Summer 2010
	<i>Tensor tomography of stress-induced birefringence in commercial glasses</i> IMA, University of Minnesota, Minneapolis, MN, Advisor: Douglas Alan (Corning).	Summer 2009
	Senior honor's thesis: <i>An introduction to fractals and Hausdorff measures</i> University of Utah, Advisor: D. Khoshnevisan.	Spring 2006
	REU physics project: <i>Optical beam profile monitor for LENS ion source</i> Indiana University Cyclotron Facility (IUCF), Advisors: V. Derenchuk, K. Solberg.	Summer 2005
	REU math project: Reading course on analysis and partial differential equations University of Utah, Advisor: N. Smale.	Spring 2005
PROFESSIONAL AFFILIATIONS	SIAM: Society for Industrial and Applied Mathematics American Mathematical Society University of Wisconsin-Madison SIAM Student Chapter Golden Key Honor Society Pi Mu Epsilon Honor Society Sigma Pi Sigma Honor Society	Member, 2009 – present Member, 2006 – present Co-founder, Treasurer, 2009 – 2010
SOFTWARE DEVELOPER	DoGPack : the Discontinuous Galerkin Package available online: http://www.dogpack-code.org/ FINESS : the FINite difference ESSentially non-oscillatory software package available online: https://bitbucket.org/dseal/finess/	
PROGRAMMING LANGUAGES	C++, Python, C, Matlab, Java	
SOFTWARE TOOLS	\LaTeX , Maple, Git, Subversion, PETSc	
OPERATING SYSTEMS	Linux, Mac OS X, Windows	
REFERENCES	James A. Rossmanith Department of Mathematics Iowa State University (515) 294-8155 rossmani@iastate.edu	Andrew J. Christlieb Department of Mathematics Department of Electrical and Computer Engineering Michigan State University (517) 353-3831 andrewch@math.msu.edu
	Sigal Gottlieb Department of Mathematics University of Massachusetts Dartmouth (508) 999-8320 sgottlieb@umassd.edu	Jennifer Ryan School of Mathematics University of East Anglia +44 (0)1603 592586 Jennifer.Ryan@uea.ac.uk

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