

## **NATASHA FLYER - CURRICULUM VITAE**

Institute for Mathematics Applied to Geosciences  
National Center for Atmospheric Research  
Boulder, CO 80305

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### **EDUCATION**

- 1999 Ph.D. University of Michigan, Ann Arbor (Atmospheric & Space Science)
- 1993 B.A. Northwestern University, Evanston, IL (Geological Sciences)

### **PROFESSIONAL APPOINTMENTS**

- 2010-present Scientist III  
National Center for Atmospheric Research (NCAR)
- 2006-2010 Scientist II  
NCAR
- 2003-2006 Scientist I  
NCAR
- 2000-2003 NSF Postdoctoral Fellow, Department of Applied Mathematics  
University of Colorado, Boulder
- 1999-2000 Advanced Study Postdoctoral (ASP) Fellow  
NCAR, Boulder, CO
- 1995-1998 NASA Graduate Student Research (GRFP) Fellow  
University of Michigan, Ann Arbor

### **ADJUNCT/AFFILIATED PROFESSOR POSITIONS**

- 2011-present Dept. of Scientific Computing, Florida State University
- 2011-present Dept. of Mathematics, Boise State University
- 2008-present Dept. of Information Technology, Uppsala University, Sweden
- 2007-present Dept. of Applied Mathematics, University of Colorado-Boulder
- 2006-2011 Dept. of Mathematics, Kyungpook National University, Daegu, South Korea

### **AWARDS**

- Fall 2010 University of Oxford Research Fellowship, UK  
Oxford Centre for Collaborative Applied Mathematics
- Spring 2009 University of Oxford Research Fellowship, UK  
Oxford Centre for Collaborative Applied Mathematics
- 1998 University of Michigan Distinguished Achievement Award
- 1995-1998 NASA Graduate Student Research Fellowship (4 awarded in the USA in 1995)
- 1993 Phi Beta Kappa Honor Society
- 1993 Northwestern University Award for Outstanding Scientific Accomplishment

## GRANTS

NSF Collaboration in Mathematical Geosciences (NSF-DMS 0934317) 2009-2015

Title: *Fast and Efficient Radial Basis Function Algorithms for Geophysical Modeling on Arbitrary Geometries*

PI: Natasha Flyer

Co-investigative universities: Boise State, Florida State, U. of Minnesota, U. of California-Davis

Total Award: \$1,000,000 Each Sub-Award: \$200,000

NSF PetaApps, Office of CyberInfrastructure (NSF-OCI 0904599) 2009-2013

Title: *Collaborative Research: A multiscale unified simulation environment for geoscientific applications*

PI: Natasha Flyer

Co-investigative universities: University of Wyoming, Virginia Tech

Total Award: \$1,000,000 NCAR Sub-Award: \$ \$616,822

NSF Collaboration in Mathematical Geosciences (NSF-ATM 0620100) 2006-2011

Title: *Freedom from Coordinate Systems, and Spectral Accuracy with Local Refinement: Radial Basis Functions for Climate and Space-Weather Prediction*

PI: Natasha Flyer

Co-investigative universities: Arizona State, U. of Colorado-Boulder, Boise State, U. of Michigan

Total Award: \$513,152 NCAR Sub-Award: \$317,171

NSF/NCAR Opportunity Fund 2005-2008

Title: *Developing High-Precision Numerical Prototypes for Space-Weather Prediction*

PI: Natasha Flyer

Award: \$163,450

NSF Small Grants for Exploratory Research (SGER) 2006-2007

Title: *Coronal Mass Ejection Initiations as a Result of Magnetic Helicity Accumulation in the Solar Corona*

PI: Mei Zhang , Co-PIs: Joan Burkepile, Natasha Flyer, B.C. Low (All NCAR personnel)

Award: \$23,780

## COMMUNITY SERVICE

1. National and international panels, advisory boards, and review committees

- The National Academies of Science, Engineering, and Medicine: 2007, 2008, 2009, 2010
- NSF/Division of Mathematical Sciences: Applied Mathematics: 2008 through 2012, 2015
- NSF/Division of Geosciences: 2008, 2011
- NSF/Division of Advanced Cyberinfrastructure: 2014
- NASA: 2005, 2006
- Research Grants Council of Hong Kong: 2014, 2015
- Nordic eScience Globalisation Initiative: 2014, 2015
- Oxford Centre of Collaborative and Applied Mathematics: 2012
- National Research Council of South Africa: Applied Mathematics 2006, 2011, 2012

## 2. Conference/Workshop/Mini-Symposium Organizer

- Organizing Committee, Korean SIAM Spring Conference, 2006
- Organizing Committee, PDEs on a Sphere, Santa Fe, NM, 2009  
<http://cnls.lanl.gov/pde/>
- Organizing Committee, “*Impact of Waves Along Coastlines*”, Institute for Mathematics and its Applications (IMA), Minneapolis MN 2014  
<http://www.ima.umn.edu/2014-2015/SW10.14-17.14/>
- Organizing Committee, CMG++ Consortium of Mathematics in the Geosciences, Boise ID, 2014  
<http://math.boisestate.edu/cmfg/about-cmg-2/>
- Organizing Committee, Bridging the Gap between the Geosciences and Mathematics, Statistics, and Computer Science, Princeton University NJ, 2014  
<http://geoweb.princeton.edu/people/simons/bridgingthegap.html>
- Organizer, NCAR workshop, “*Numerical Methods for Free-Boundary Problems*”, 2009  
<https://www.image.ucar.edu/Workshops/TOY2009/focus03/>
- Organizer, Mini-symposium, “*Radial Basis Functions on the Sphere for Geophysical Applications*”, SIAM Computational Issues in the Geosciences, Santa Fe, NM, 2007
- Organizer, Mini-symposium, “*Workshop on Petascale Computing: Its impact on geophysical modeling and simulation*”, May, Theme of the Year, NCAR, 2008
- Organizer, Mini-symposium, “*Advanced techniques in radial basis function approximation for PDEs, Parts I & II*”, European Conference on Numerical Mathematics and Advanced Applications (ENUMATH), Sweden, 2009
- Organizer, Mini-symposium, “*Radial Basis Functions (RBF-FD) for the Geosciences*”, SIAM Annual Meeting, Chicago IL, 2014

## 3. NCAR Service

- Participant, President’s Council review of NCAR strengths, weaknesses, opportunities & threats, 2003
- Participant, Committee for the formation of the Institute of Mathematics Applied to Geosciences, 2003
- Participant, Meeting with NCAR Advisory Board, 2004
- Committee member, ASP Scientist I Search, 2004-2005
- Committee member, ASP Advisory Committee, review and enhancement suggestions of ASP, 2006
- Committee member, IMAGE Retreat Planning Committee, planning as well as participation, 2006
- Committee member, SOARS Steering Committee, 2010-2012
- Reviewer for NCAR Scientist I and ASP postdoctoral applications 2004-2010
- Reviewer for SIParCS Program applications
- CISL representative, Early Career Scientist Assembly (ECSA) Steering Committee, 2004 and 2005
- CISL representative, ASP Search Committee, 2010 – present
- CISL representative, NSA-EC, 2013 – present
- Manages CISL Research and Supercomputing Visitor Program (RSVP), 2014 - present

## 4. Journal Referee

Referee for over 20 journals such as:

SIAM journals (Applied Math, Scientific Computing) Elsevier journals such as J. of Comput. Physics, IMA Journals (Oxford Press), Proceedings of the Royal Society, AMS journals, etc.

Average referee rate: 17 papers a year

## 5. Student and Postdoctoral Research Advisor/Mentor/Funder

Postdoctoral Mentoring/Funding (if stated at 100%):

1. Cecile Piret, ASP fellow (2008-2010)  
(funded 1/3 of salary)
2. Anders Malmberg, Geophysical Statistics Project (GSP), NCAR (2007-2008)
3. Erik Lehto, Postdoctoral Fellow (2012-2013)  
(funded 1 year)
4. Victor Bayona, Postdoctoral Fellow (funded 1 year, 2013-2014)  
ASP fellow 2014-2015

Ph. D Student Co-Advisor/Funding (if stated at 100%):

1. Ben Jamroz, Dept. of Applied Math, CU-Boulder  
(funded for 1.5 years, *defended* 2009)
2. Lei Wang, Dept. of Math, Univ. of Michigan – Ann Arbor  
(funded for 1 year, *defended* 2010)
3. Zhen Qin, Institute of Scientific Computing & Applied Math, Indiana Univ.-Bloomington,  
(funded for 1 month, *defended* 2011)
4. Erik Lehto, Division of Scientific Computing, Uppsala University, Sweden  
(funded for 3 years, *defended* 2012)
5. Evan Bollig, Dept. of Scientific Computing, Florida State University,  
(funded for 1 year, *defended* 2013)
6. Adrean Webb Dept. of Applied Math, CU – Boulder,  
(*defended* 2013)
7. Greg Barnett Dept. of Applied Math, CU – Boulder,  
(funded for 1 year, *defended* 2015)
8. Bradley Martin Dept. of Applied Math, CU – Boulder,  
(funded Summer 2015, *to defend* 2016)

Master (MSc) Students Co-Advisor/Funding:

1. Major Jennifer Russell (Air Force), Dept. of Applied Math, CU – Boulder  
(*defended* 2010)
2. Joe Lohemeier, Dept. of Math, Boise State University, ID  
(funded Summer 2010, *defended* 2011)
2. Christopher-Ian Davis, Dept. of Applied Math, CU-Boulder  
(*defended* 2011)
3. Colin Powell, Dept. of Applied Math, CU-Boulder,  
(*defended* 2011)

SIParCS mentor (<http://www2.cisl.ucar.edu/siparcs>)

1. Mudambi Srivatsa, Dept. of Computer Science, University of Utah, Salt Lake City  
(*to defend* 2016)

## 6. Education Outreach Activities

### University Level:

- Conduct a joint research group on radial basis functions with Prof. Bengt Fornberg at the University of Colorado-Boulder, Department of Applied Mathematics
- NCAR representative, Colorado Conference for Women in Computing, 2008 and 2011
- Panelist, Colorado Conference for Women in Computing, 2008, “*What a Ph.D. gets you?*” Boulder, CO
- Undergraduate Project Mentor, Department of Physics, University of Colorado -Boulder, 2004.
- Talk, “*The role of science and technology in today’s society*”, University of Denver School of Business, 2004

### K-12 educational activities:

- Talk, “*Applications of mathematics at NCAR*”, Adams High School Math Club, 2005
- Talk, “*Applied math in the geosciences*”, Colorado High School Honors Institute, Boulder, CO, 2005 and 2006
- Science fair judge, Peak-to-Peak Academy, Lafayette, CO, 2007, 2008
- Regular volunteer for Education and Outreach Program at NCAR

## INVITED TALKS (fully or partly funded by host)

1. “*Radial basis functions: A new technique for solving PDEs*”, Dept. of Applied Mathematics, University of Colorado, Boulder, 2002.
2. “*Corner singularities for initial -boundary value problems - Illustration and remedy for convective-diffusive equations*”, Department of Mathematics, Hong Kong Baptist University, March 2002.
3. “*Convergence of spectral and finite-difference methods for initial-boundary value problems*”, Department of Mathematics, Hong Kong Baptist University, June 2002.
4. “*Accurate numerical resolution of transients for convection-diffusion equations*”, Department of Scientific Computing, Uppsala University, Sweden, June 2002.
5. “*The elusive time-space corner singularity: The nature of initial-boundary value problems*”, Korean Advanced Institute of Science and Technology (KAIST), Taegon, South Korea, March 2004.
6. “*Radial basis functions: The basics and why they are hot*”, 12<sup>th</sup> Applied Math Forum of South Korea, March 2004, (Plenary speaker)
7. “*The elusive time-space corner singularity: The nature of initial-boundary value problems*”, Department of Mathematics, Kyungpook National University, Daegu, South Korea, 2004
8. “*The elusive time-space corner singularity: The nature of initial-boundary value problems*”, Colorado School of Mines, 2004
9. “*Applications of asymptotics to geophysical fluid dynamics*”, Division of Scientific Computing, Uppsala University, Sweden, 2005
10. “*The nature of initial-boundary value problems and their ramifications on high order methods*”, Department of Mathematics, University of Utah, Salt Lake City, 2006
11. “*Solving hyperbolic PDEs in spherical geometry with radial basis functions*”, Korean SIAM Annual Meeting, Daegu, South Korea, May, 2006 (Plenary speaker)
12. “*Transport schemes on a sphere using radial basis functions*”, Division of Scientific Computing, Uppsala University, Sweden, 2006.
13. “*Modeling simple atmospheric flows on a sphere using radial basis functions*”, Department of Applied Math, University of Colorado, Boulder, 2007
14. “*The character of initial-boundary value problems and their numerical solution*”, Wichita State University, Kansas, 2007

15. “*The character of initial-boundary value problems and their numerical solution*”, University of Cambridge, Department of Applied Mathematics and Theoretical Physics, UK, 2007 (Plenary speaker)
16. “*Geophysical modeling using radial basis functions*”, Division of Scientific Computing, Uppsala University, Sweden, 2008.
17. “*Geophysical modeling using radial basis functions*”, Max Planck Institute for Plasma Physics, Garching, Germany, 2008.
18. “*Moving vortices on a sphere: Local node refinement for radial basis functions*”, SIAM Annual Meeting, San Diego, CA, 2008.
19. “*A radial basis function shallow water model and local refinement*”, Los Alamos, NM, 2008.
20. “*Geophysical modeling using radial basis functions*”, Department of Math, Univ. of Wyoming, 2008
21. “*Applications of radial basis functions to solid earth geophysics*”, SANUM (South African Symposium on Numerical and Applied Mathematics), University of Stellenbosch, South Africa, 2009 (Plenary speaker)
22. “*Applications of radial basis functions to modeling atmospheric flows*”, Department of Atmospheric, Oceanic, & Planetary Physics, University of Oxford, UK, 2009.
23. “*Radial basis functions methods for modeling atmospheric and solid earth flows*”, Mathematical Institute, University of Oxford, UK, 2009. <http://www.maths.ox.ac.uk/node/7306>
24. “*Modeling mantle convection in a 3-D spherical shell with a hybrid radial basis function method*”, ENUMATH (European Conference on Numerical Mathematics and Advanced Applications), Uppsala University, Sweden, 2009. <http://www.enumath.eu/link/uppsala.html>
25. “*Radial basis function methods for the geosciences*”, Illinois Institute of Technology, 2009.
26. “*The elusive time-space corner singularity: The hidden nature of initial-boundary value problems and its impact on numerics*”, University of Indiana, Bloomington, IN, 2009.
27. “*Radial basis function methods for geofluid modeling*”, Institute for Mathematics and its Applications (IMA), University of Minnesota, Minneapolis-St. Paul, MN, 2010 <http://www.ima.umn.edu/videos/index.php?id=1224> (web – casted)
28. “*A hybrid analytical-numerical method for evolutionary PDEs*”, International Centre for Mathematical Sciences (ICMS), Edinburgh, UK, 2010 (Plenary Speaker) <http://www.icms.org.uk/workshops/painleve>
29. “*The Gibbs phenomenon for radial basis functions*”, SIAM Annual Meeting, 2010.
30. “*Recent developments in radial basis functions*”, SIAM Annual Meeting, 2010.
31. “*Resolving planetary-scale flows with radial basis functions*”, SIAM Annual Meeting, 2010
32. “*The elusive time-space corner singularity: The hidden nature of initial-boundary value problems and its impact on numerics*”, University of Kent, UK, 2010
33. “*The hidden nature of initial-boundary value problems and its impact on numerics*”, University of Oxford, UK, 2010
34. “*Radial basis function methods for computational geosciences*”, Arizona State University, 2011 <http://math.asu.edu/node/3333>
35. “*Radial basis functions for computational geoscience*”, Current Challenges in Climate Modelling, Uppsala University, Sweden, May 26-27, 2011 (Plenary Speaker) [http://www2.math.uu.se/cim/events/abstract\\_climate\\_Flyer.html](http://www2.math.uu.se/cim/events/abstract_climate_Flyer.html)
36. NSF/CBMS Regional Conference in the Mathematical Sciences-“*Radial Basis Functions*”, University of Massachusetts-Dartmouth, Dept. of Mathematics, June 2011 (1 of 2 Principal Lecturers –funded by grant from NSF) [http://cbmsweb.org/NSF/2011\\_conf.htm](http://cbmsweb.org/NSF/2011_conf.htm)

37. “*Radial Basis Functions: A novel mesh-free method for computing multi-scale geophysical flows*”, Geophysical Fluid Dynamics Laboratory, Florida State University, 2012  
<http://www.gfdi.fsu.edu/People/Past-Visitors>
38. “*Improving Numerical Accuracy for Solving Evolutionary PDEs in the Presence of Corner Singularities*”, University of Colorado-Colorado Springs, 2012.  
<http://www.uccs.edu/Documents/math/flyer.pdf>
39. “*Radial Basis Functions: Freedom from meshes in scientific computations*”, Dept. of Scientific Computing, Florida State University, 2012.
40. “*Improving Numerical Accuracy in the Presence of Corner Singularities*”, Boundary value problems for linear elliptic and integrable PDEs: theory and computation, International Centre for Mathematical Sciences (ICMS), Edinburgh, UK, 2012, <http://www.icms.org.uk/downloads/ATMCS5/Flyer.pdf>
41. “*Radial Basis Function-Generated Finite Differences for Scientific Computing: Freedom from meshes with low computational cost*”, Div. of Scientific Computing, Uppsala University, Sweden, 2012.
42. “*Advances in Novel Numerical Methodologies for the Geosciences: An Avenue for Developing Collaboration Environments Toward Scientific Discovery*”, Bridging the Gap between the Geosciences and Mathematics, Statistics, and Computer Science, Princeton University, 2012, <http://geoweb.princeton.edu/people/simons/bridgingthegap.html> (Plenary Speaker)
43. “*On the instability of classical steady-state solutions for mantle convection benchmarks in 3D spherical shells*”, Mantle Convection and Lithospheric Dynamics Workshop, UC-Davis, CA 2012  
<https://geodynamics.org/cig/events/calendar/2012-mantle-convection-and-lithospheric-dynamics-workshop/>
44. “*Radial Basis Function-Generated Finite Differences: A mesh-free approach to scientific computing in the geosciences*”, European Centre for Mid-Range Weather Forecasting (ECMWF), Reading, UK, 2013.
45. “*Radial Basis Function-Generated Finite Differences: A mesh-free approach to scientific computing in the geosciences*”, University of Bath, UK, 2013.
46. “*A New RBF-FD method: Applications to Mesoscale Nonhydrostatic Atmospheric Modeling*”, CU-Boulder, Dept. of Mechanical Engineering colloquium, 2014
47. “*Guidelines to modeling the Navier-Stokes and Euler eqns. with Radial Basis Function-generated Finite Differences*”, CU-Denver, Dept. of Mathematics and Statistics colloquium, 2014.
48. “*Radial Basis Functions: Freedom from meshes in geo-scientific computations*”, Colorado State University, Dept. of Mathematics colloquium, 2014
49. “*A Fast Algorithm for Distributing Nodes with Variable Density: Towards Better Resolution of Coastal Areas*”, Institute for Mathematics and its Applications (IMA), Minneapolis MN 2014  
<http://www.ima.umn.edu/videos/?id=2802> (web – casted)
50. “*A Fast Algorithm for Distributing Nodes with Variable Density*”, Michigan Technological University, Applied Math Seminar, 2015
51. “*Radial Basis Functions Freedom from meshes in scientific computing: Developments and Applications*”, Michigan Technological University, Dept. of Math colloquium, 2015
52. “*Fast and Efficient Mesh/Grid-Free Methods for Computational Geoscience*”, Texas A & M University, Corpus Christi, Dept. of Physical & Environmental Sciences colloquium, 2015
53. “*Freedom from Grids in Geo-scientific Computations: Radial Basis Function – Generated Finite Differences*”, Midwest Mathematics and Climate Conference, Sponsored by IMA, NSF, and Univ. of Kansas (Depts. of Mathematics and Atmospheric Science)  
<http://www.math.ku.edu/conferences/2015/M2C2/speakers.html>

## PUBLICATIONS (ordered from oldest to newest)

Ph.D. Thesis: *The Effect of Upper Level Features in The Atmosphere on Linear Theory and Linearized Benjamin-Davis-Ono Theory for Internal Gravity Waves*, University of Michigan Press, Ann Arbor, 1999.

### Peer-Reviewed Journal Articles:

1. N. Flyer, Asymptotic upper bounds for the coefficients in the Chebyshev series expansion for a general order integral of a function, *Mathematics of Computation*, 67, 1601-1616, 1998.
2. K. Kabin and N. Flyer, Reminiscences about difference schemes by Sergei Konstantinovich Godunov (translation from Russian), *Journal of Computational Physics*, 153, 6-25, 1999.
3. J. P. Boyd and N. Flyer, Compatibility conditions for time-dependent partial differential equations and the rate of convergence of Chebyshev and Fourier spectral methods, *Computer Methods in Applied Mechanics and Engineering*, 175, 281-309, 1999.
4. N. Flyer and P. N. Swarztrauber, Convergence of spectral and finite difference methods for initial-boundary value problems, *SIAM Journal of Scientific Computing*, 23(5), 1731-1751, 2002.
5. N. Flyer and B. Fornberg, Accurate numerical solution of initial transients in convective-diffusive equations, *Journal of Computational Physics*, 184(2), 526-539, 2003
6. N. Flyer and B. Fornberg, On the nature of initial-boundary value solutions for dispersive equations, *SIAM Journal of Applied Mathematics*, 64(2), 546-564, 2004.
7. N. Flyer, B. Fornberg, S. Thomas and B.C. Low, Magnetic field confinement in the solar corona. I. Force-free fields, *The Astrophysical Journal*, 606, 1210-1222, 2004
8. N. Flyer, B. Fornberg, S. Thomas and B.C. Low, Magnetic field confinement in the solar corona. II. Field-plasma interaction, *The Astrophysical Journal*, 631, 1239-1259, 2005
9. B. Fornberg and N. Flyer, Accuracy of radial basis function interpolation and derivative approximations in 1-D, *Advances in Computational Mathematics*, 23, 5-20, 2005.
10. M. Zhang, N. Flyer, B.C. Low, Magnetic field confinement in the corona: The role of magnetic helicity accumulation, *The Astrophysical Journal*, 644(1), 575-586, 2006.
11. N. Flyer, Exact polynomial reproduction for oscillatory radial basis functions on infinite lattices, *Computers and Mathematics with Applications*, 51(8), 1199-1208, 2006.
12. N. Flyer and G.B. Wright, Transport schemes on a sphere using radial basis functions, *Journal of Computational Physics*, 226, 1059-1084, 2007.
13. B.C. Low and N. Flyer, The topological nature of boundary value problems for force-free magnetic field, *The Astrophysical Journal*, 668(1), 557-570, 2007.
14. B. Fornberg, N. Flyer, S. Hovde, C. Piret, Locality properties of radial basis function expansion coefficients for equispaced interpolation, *IMA Journal of Numerical Analysis*, 28, 121-142, 2008.
15. A. Malmberg, A. Arellano, D. P Edwards, N. Flyer, D. Nychka, and C. K Wikle, Interpolating fields of carbon monoxide data using a hybrid statistical-physical model, *Annals of Applied Statistics.*, 2(4), 1231-1248, 2008.
16. N. Flyer and A.S. Fokas, A hybrid analytical-numerical method for solving evolution partial differential equations. I. The half-line, *Proc. Roy. Soc. A*, 464(2095), 1823-1849, 2008.
17. M. Zhang and N. Flyer, The dependence of the helicity bound of force-free magnetic fields on boundary conditions, *The Astrophysical Journal*, 683(2), 1160-1167, 2008.
18. N. Flyer and G.B. Wright, A radial basis function method for the shallow water equations on a sphere, *Proceedings of the Royal Society A*, 465, 1949-1976, 2009.

19. A.S. Fokas, N. Flyer, S.A. Smitherman, E. Spence, A semi-analytical numerical method for solving evolution and elliptic partial differential equations, *J. Comput. Appl. Math.*, 227, 59-74, 2009.
20. K. Miller, B. Fornberg, N. Flyer, and B.C. Low, Magnetic relaxation in the solar corona, *The Astrophysical Journal*, 690, 720-733, 2009.
21. B. Fornberg, N. Flyer, and J.M. Russell, Comparisons between pseudospectral and radial basis function derivative approximations, *IMA Journal of Numerical Analysis*, 30, 149-172, 2010.
22. N. Flyer and E. Lehto, Rotational transport on a sphere: Local node refinement with radial basis functions, *Journal of Computational Physics*, 229, 1954-1969, 2010.
23. G.B. Wright, N. Flyer and D.A. Yuen, A hybrid radial basis function pseudospectral method for thermal convection in a 3-D spherical shell, *Geophys., Geochem., Geosyst.*, 11, Q07003, 2010.
24. N. Flyer and B. Fornberg, Radial basis functions: Developments and applications to planetary scale flows, *Computers and Fluids*, 46, 23-32, 2011.
25. B. Fornberg, E. Larsson, and N. Flyer, Stable computations with Gaussian radial basis functions, *SIAM J. Sci. Comput.*, 33(2), 869-892, 2011.
26. Fornberg, B. and Flyer N., A numerical implementation of Fokas boundary integral approach: Laplace's equation on a polygonal domain, *Proc Roy. Soc. A*, 467(2134), 2983-3003, 2011.
27. N. Flyer, Z. Qin, and R. Temam, A penalty method for numerically handling dispersive equations with incompatible initial and boundary data, 28(6) , *Num. Meth. PDEs*, 1996-2009, 2012.
28. N. Flyer, E. Lehto, S. Blaise, G. Wright, A. and St. Cyr, RBF-generated finite differences for nonlinear transport on a sphere: shallow water simulations, *J. Comp. Phys.*, 231, 4078-4095, 2012.
29. M. Zhang, N. Flyer, and B.C. Low, Magnetic helicity of self-similar axisymmetric force-free fields, 755:78 (9pp), *The Astrophysical Journal*, 2012.
30. E. Bollig, N. Flyer, and G. Erlebacher, Solution to PDEs using radial basis function finite-differences (RBF-FD) on multiple GPUs, 231(21), *J. Comp. Phys.*, 7133-7151, 2012.
31. G. Erlebacher, E. Saule, N. Flyer, E. Bollig, Acceleration of derivative calculations with application to radial basis function finite-differences on the intel mic architecture, *ICS '14 Proceedings of the 28th ACM international conference on Supercomputing*, 263-272, 2014.
32. P.-A Arrial, N. Flyer, G. B. Wright, and L. H. Kellogg, On the sensitivity of 3-D thermal convection codes to numerical discretization: a model intercomparison, *Geosci. Model Dev.*, 7(5), 2065-2076, 2014.
33. B. Fornberg and N. Flyer, Fast generation of 2-D node distributions for mesh-free PDE discretizations, *Comput. Math Appl.*, 69 (7), 531-544, 2015.
34. M. Tilenius, E. Larsson, E. Lehto, and N. Flyer, A scalable RBF-FD method for atmospheric flow, *J. Comput. Phys.*, 298, 406-422, 2015.
35. V. Bayona, N.Flyer, G. M. Lucas, and A. J. G. Baumgaertner, A 3-D RBF-FD solver for modelling the atmospheric Global Electric Circuit with topography (GEC-RBFFD v1.0), *Geosci. Model Dev.*, in press, 2015.
36. G.A. Barnett, N. Flyer and L. J. Wicker, An RBF-FD polynomial method based on polyharmonic splines for the Navier-Stokes equations: Comparisons on different node layouts, *J. Comput. Phys.*, submitted 2015.

### Book Chapters (Peer-Reviewed)

1. B. Fornberg and N. Flyer, Solving PDEs with Radial Basis Functions, *Acta Numerica*, 2015.
2. N. Flyer, G.B. Wright, and B. Fornberg, Radial basis function-generated finite differences: A mesh-free method for computational geosciences, in *Handbook of Geomathematics*, eds. W. Freeden, Z. Nashed and T. Sonar, Springer-Verlag, Berlin, Germany, 2014.
3. B. Fornberg and N. Flyer, The Gibbs Phenomenon for Radial Basis Functions, in *The Gibbs Phenomenon in Various Representations and Applications*, ed. A. Jerri, Chapter 6, pp. 201-224, Sampling Publishing, Potsdam, NY, 2011.

### Books

B. Fornberg and N. Flyer, *A Primer on Radial Basis Function with Applications to the Geosciences*, SIAM Press, Philadelphia, PA, 2015.

### Software Products (available free on a Git repository)

V. Bayona and N. Flyer, 2015, A 3-D Radial Basis Function-generated Finite Difference (RBF-FD) solver for the atmospheric Global Electric Circuit (GEC) with topography, GEC-RBFFD v1.0  
[https://vbayona@bitbucket.org/vbayona/gec\\_rbffd.git](https://vbayona@bitbucket.org/vbayona/gec_rbffd.git)