

DONALD A. FRENCH

Education:

- B.A. Mathematics and Physics, SUNY at Oswego (1980).
M.S. Applied Mathematics, Cornell University (1983).
Ph.D. Applied Mathematics, Cornell University (1985).
Thesis titled *The finite element method for a degenerate elliptic equation*.
Completed under the supervision of Professor Lars B. Wahlbin.

Positions:

Computer Programmer	General Electric Syracuse, Summers 1978-1981.
Teaching Assistant	Cornell University, 1980-3.
Fellowship	Cornell University, 1983-4.
Research Assistant	Cornell University, 1984-5.
Research Assistant Professor	Purdue University, 1985-7.
Visiting Scientist	University of Minnesota, Summer 1987.
Assistant Professor	Carnegie Mellon University, 1987-90.
Assistant Professor	University of Cincinnati, 1990-3.
Visiting Professor	University of Maryland (B.C.), 1995-6.
Sabbatical Leave	University of Minnesota, 1997-8.
Associate Professor	University of Cincinnati, 1993-1999.
Full Professor	University of Cincinnati, 1999-Present.
Graduate Program Director	University of Cincinnati (Math), 1999-2001.
Hosted M.I.M Copetti	Mathematics (Universidade Federale Santa Maria, Brazil), 2001-2002.
Taft Center Fellow	Taft Research Center, 2011-2012.
Contractor	Wright Patterson Air Force Base (2010-2016).
Graduate Program Director	University of Cincinnati (Math), 2015-Present.

Research Interests:

Applied mathematics, numerical analysis, partial differential equations, finite element methods, industrial mathematics, computational neuroscience, and finite difference methods.

Publication History:

Journal Articles:

1. The finite element method for a degenerate elliptic equation, *SIAM J. Num. Anal.*, **24** (1987), 788-815.
2. Numerical studies of the Cahn-Hilliard equation for phase separation (with Charles M. Elliott), *IMA J. of Appl. Math.*, **38** (1987), 97-128.
3. A nonconforming finite element method for the Cahn-Hilliard equation (with Charles M. Elliott), *SIAM J. of Num. Anal.*, **26** (1989), 884-903.
4. A second order splitting method for the Cahn-Hilliard equation (with Charles M. Elliott and Fabio Milner), *Numerische Mathematik*, **54** (1989), 575-590.

5. On the convergence of finite element methods for a relaxed variational problem, *SIAM J. of Num. Anal.*, **27** (1990), 419-436.
6. Continuous finite element methods which preserve energy properties for nonlinear problems (with Jack W. Schaeffer), *Appl. Math. Comp.*, **39** (1990), 271-295.
7. Numerical computations on a Cahn-Hilliard model of solidification, *Appl. Math. Comp.*, **40** (1990), 55-76.
8. Behaviour in the large of numerical solutions to one-dimensional nonlinear viscoelasticity by continuous time Galerkin methods (with Soren Jensen), *Comp. Meth. Appl. Mech. Eng.*, **86** (1991), 105-124.
9. Approximation of an elliptic control problem by the finite element method (with J. Thomas King), *Num. Funct. Anal. Opt.*, **12** (1991), 299-314.
10. Analysis of a finite element approximation for a parabolic equation with rough boundary data (with J. Thomas King), *Math. Comp.*, **60** (1993), 79-104.
11. On the numerical approximation of second order hyperbolic equations by space-time finite element methods, *Comp. Meth. Appl. Mech. Eng.*, **107** (1993), 145-157.
12. On the numerical approximation of an evolution problem in nonlinear viscoelasticity (with Lars B. Wahlbin), *Comp. Meth. Appl. Mech. Eng.*, **107** (1993), 101-116.
13. Long time behaviour of arbitrary order continuous time Galerkin schemes for some one-dimensional phase transition problems (with Soren Jensen), *IMA J. Num. Anal.*, **14** (1994), 421-442.
14. Finite element approximation of an evolution problem modeling shear band formation, (with Sonia M.F. Garcia), *Comp. Meth. Appl. Mech. Eng.*, **118** (1994), 153-163.
15. Global error control for the continuous Galerkin finite element method for ordinary differential equations, (with Donald Estep), *RAIRO*, **28** (1994), 815-852.
16. Global dynamics of a discontinuous Galerkin approximation to a class of reaction-diffusion equations, (with Soren Jensen), *Appl. Num. Math.*, **18** (1995), 473-487.
17. A continuous space-time finite element method for the wave equation, (with Todd E. Peterson), *Math. Comp.*, **65** (1996), 491-506.
18. Computation of large shear deformations of a thermoplastic material, *Num. Meth. Part. Diff. Eq.*, **12** (1996), 393-406.
19. Discontinuous Galerkin finite element methods for a forward-backward heat equation, *Appl. Numer. Math.* **28** (1998), 37-44.
20. Asymptotic and computational analysis of large shear deformations of a thermoplastic material, (with David Edwards), *SIAM J. Appl. Math.*, **59** (1998), 700-724.
21. Continuous Galerkin finite element methods for a forward-backward heat equation, *Numer. Meth. Part. Diff. Eq.*, **15** (1999), 257-265.

22. Origins, analysis, and numerical analysis of a forward-backward parabolic equation, (with A.K. Aziz, S. Jensen, and R.B. Kellogg), *Math. Model. Numer. Anal. (M²AN)*, **33** (1999), 895-922.
23. Finite element approximation of solutions to a class of nonlinear hyperbolic-parabolic equations, (with S. Jensen and T. Seidman), *Appl. Numer. Math.*, **31** (1999), 429-450.
24. A posteriori error estimates for a finite element approximation of the obstacle problem in L^∞ , (with S. Larsson and R. Nochetto) *Computational Methods in Applied Mathematics*, **1** (2001), 18-38.
25. A posteriori error estimates for general numerical methods for the Hamilton-Jacobi equation, (with S. Albert, B. Cockburn and T. Peterson), *Math. Comp.*, **71** (2001), 49-76.
26. Numerical solution of a thermoviscoelastic contact problem by a penalty method (with M.I.M. Copetti), *SIAM J. Num. Anal.* **41** (2003), 1487-1504.
27. Analysis of the convergence behavior of the localized nonlinear approximation for electromagnetic scattering, *J. Comp. Appl. Math.*, **161** (2003), 27-39.
28. Numerical studies of thermoelastic contact problem, (with M.I.N. Copetti), *Applied Mathematical Modeling*, **28** (2004), 323-332.
29. Identification of a free energy functional in an integro-differential equation model for neuronal activity, *Appl. Math. Lett.*, **17** (2004), 1047-1051.
30. A posteriori error estimates for low order continuous and discontinuous Galerkin methods for a thermoelastic contact problem, (with M.I.M. Copetti), *Appl. Num. Math.*, **55** (2005), 439-457.
31. Error Analysis of a Specialized Numerical Method for Differential Equation Models in Neuroscience, (with J. Oh), *Appl. Math. Comput.*, **172** (2006), 491-507.
32. Identification of CNG channel distributions in frog olfactory cilia, (with R. Flannery, C. Groetsch, W. Krantz and S. Kleene), *Math. Comp. Modelling*, **43** (2006), 945-956.
33. Clustering of CNG channels in the cilia of frog olfactory receptor neurons (with R. Flannery and S.J. Kleene) *Biophys. J.*, **91** (2006), 179-188.
34. An Integrate-and-Fire Model for Synchronized Bursting in a Network of Cultured Cortical Neurons, (with E. Grunstein), *J. Comp. Neurosci.*, **21** (2006), 227-241.
35. Numerical Approximation of Solutions of a Constrained Integral Equation Arising in Olfaction Experimentation (with C. Groetsch), *J. of Physics: Conference Series* **73**, (2007), 1-10.
36. Perturbation derivation of ligand-gated ion channel distributions arising in olfaction experimentation (with D. Edwards), *J. Math. Biology*, **55** (2007), 745-765.
37. Analysis of the dynamics of CNG and Cl(Ca) ion channels in olfactory cilia (with Dorjsuren Badamdorj, D.A. Edwards, and S.J. Kleene), *Math. Meth. Appl. Sci.*, **31** (2008), 1860-1873.
38. Numerical solution of a class of integral equations arising in a biological laboratory procedure, (with C.W. Groetsch), *Integral Methods in Science and Engineering, Vol. 2, Computational Methods*, C. Constanda and E. Perez, Eds. Birkhauser, Boston (2010), ISBN 978-0-8176-4896-1.

39. Continuum models of the spread of alcoholism (with R. Braun, Z. Teymuorglu and T. Lewis), *Journal of Integral Equations and Applications*, **22** (2010), 441-462.
40. Clustering of Cl(Ca) ion channels in the cilia of frog olfactory receptor neurons (with D. Badamdorj and S.J. Kleene), *PLoS ONE* **5** (2010) (12): e15676.
41. Error Analysis of a Modified Discontinuous Galerkin Recovery Scheme for Diffusion Problems (with M. C. Galbraith and M. Osorio), AIAA Paper 2010-1071, Jan. 2010.
42. Olfactory cilia: a case study in inverse modeling, Proceedings of First (with C. Groetsch), Symposium on Inverse Problems and Applications, Ixtapa, Mexico, September 2010.
43. Error Analysis of a Modified Discontinuous Galerkin Recovery Scheme for Diffusion Problems (with M. C. Galbraith and M. Osorio), *Applied Mathematics and Computation*, **218** (2012), 7144-7154 (doi 10.1016/j.amc.2011.12.082).
44. A Galerkin meshfree method with diffuse derivatives and stabilization (with Mauricio Osorio), *Computational Mechanics*, **50** (2012) 657-664.
45. A Galerkin meshfree method with diffuse derivatives and stabilization: Two-dimensional case (with M. Osorio), *Revista Ingenieria Y Ciencia (J. Engr. Sci.)*, **9** (2013), 53-76. (In connection with the VIII Colombian Meeting on Numerical Methods).
46. Parallel EPI artifact correction (PEAC) for N/2 ghost suppression in neuroimaging applications (with Hailong Li, Kristen Fox-Neff, Benjamin Vaughan, Jerzy Szaflarski and Yu Li), In Press – *Magnetic Resonance Imaging*, (2013), 7 pages.
47. Analysis of a Chimera scheme with a finite element discretization (with M. Galbraith and J.A. Benek), AIAA Aviation January 2014.
48. Direct Overset Finite Element Methods for Aerospace Problems (with J.A. Benek, C. Schrock), AIAA Aviation June 2016.
49. Analysis of least squares meshfree method for fractional derivative problems (with Jhules Clack and Mauricio Osorio – submitted to *Projections – Journal of Mathematics*, Chilean).
50. Least Squares Overset Finite Element Methods (with J.A. Benek, C. Schrock, M. Galbraith – accepted by AIAA Aviation For June 2017).
51. Biofilms in Urban Water Distribution Systems and their Impact on Health (with N. Cogan, S. Lim, M. Kupferlee – submitted to *Math. Meth. Appl. Sci.*).
52. Analytical PDE Solution to UAV/UGV Trajectory Planning Problem by Spatio-Temporal Estimation during Wildfires (with M. Kumar, K. Cohen and B. Sharma – submitted to *Journal of Guidance, Control, and Dynamics*)
53. PDE Based Trajectory Planning for Unmanned Air Vehicles (Submitted to DCASS – with Mohammadreza Radmanesha, Manish Kumar and Kelly Cohen).
54. Analysis of neuron pairs coupled by voltage dependent gap junctions, (with Tim Lewis – in preparation).

55. Analysis of an Individual-Based Network Model for the Spread of Alcohol Abuse (with M. Eisenberg and T. Nance – in preparation).
56. Approximate solution of inverse problems arising in HIFU/MRI Problems (with Kristen Fox-Neff and B. Vaughan – in preparation).
57. Error Analysis of XFEM Schemes for problems with high frequency components (with S. Toprakseven, D. Qian and B. Vaughan – in preparation).
58. Scaling Up Agent-Based Models using Partial Differential Equations (in preparation).

Conference Proceedings:

1. Analysis and computation of solutions to an evolution problem in nonlinear viscoelasticity, *Proceedings of the Ninth Army Conference on Applied Mathematics and Computing*, **92-1** (1992), 107-113.
2. Long time behavior of a numerical approximation to a nonlinear evolution problem in viscoelasticity, *Proceedings of the Tenth Army Conference on Applied Mathematics and Computing*, **93-1** (1993), 23-28.
3. Analysis and computation of approximate solutions to a simple model of shear band formation in one and two dimensions, *Proceedings of the Eleventh Army Conference on Applied Mathematics and Computing*, **94-1** (1994), 287-298.
4. Determining index data and refracted/diffracted rays (with J.S. Abbot et al), in *Proceedings of the Eleventh Workshop on Mathematical Problems in Industry*, Los Alamos National Laboratory Technical Report LA-UR 95-4038 (1995).
5. The design of hard drive slider bearings (with F. Hendricks et al), *Proceedings of the Twelfth Workshop on Mathematical Problems in Industry*, (1997), 47-60.
6. Thermomechanical models of air gap nucleation during pure metal solidification on moving molds with periodic surface topographies (with L.G. Hector Jr. et al), *Proceedings of the Fourteenth Workshop on Mathematical Problems in Industry*, (1999).
7. A mathematical model for epitaxial semiconductor crystal growth from a vapor phase masked substrate (with M. Mauk et al), *Proceedings of the Fifteenth Workshop on Mathematical Problems in Industry*, (2000).
8. The evaluation of option prices on baskets via a perturbation approach (with P. Hagen et al – to appear in *Proceedings of the Sixteenth Workshop on Mathematical Problems in Industry*, (2001))
9. Extracting critical attributes in wireless sensor networks using modified regression polynomial (with T. Banerjee and D. Agrawal), IEEE ICNSC 2006.
10. Numerical approximation of solutions to nonlinear inverse problems arising in olfaction experimentation (with S. Kleene), to appear in *Proceedings in Applied Mathematics and Mechanics – Lectures from the 2007 ICIAM*.

Technical Reports:

1. The finite element method for a degenerate parabolic equation, Purdue University Technical Report No. 33, 1986.
2. Fully discrete finite element schemes for the Cahn–Hilliard equation (with Charles M. Elliott), Carnegie Mellon Research Report No. 88-34, 1988.
3. A space-time finite element method for the second order wave equation (with Todd E. Peterson), Technical Report of the Centre for Mathematics and its Applications, Australian National University.
4. Numerical results on a Cahn-Hilliard model of phase transition (with R.A. Nicolaides), Institute for Dynamics Technical Report No. UC-IFD93097.
5. Global Dynamics of finite element in time approximations to nonlinear evolution problems (with Soren Jensen — 1992).
6. Mathematical Modeling for Instructors (with A.Friedman and R. Gulliver Editors), IMA Preprint Series 1254, 1994.
7. Midpoint vs. Trapezoidal rule, a geometric comparison (with Don Wright — August 1998).
8. Analysis of the extended Born approximation for the Lippman-Schwinger equation for acoustic wave scattering (September 2002).

Public Lectures:

1. *The finite element method for a degenerate elliptic equation*, Finite Element Circus, Duke University, April 25-27, 1985.
2. *A nonconforming finite element method for the two-dimensional Cahn-Hilliard equation*, Finite Element Circus, Rutgers University, April 17-19, 1986.
3. *Numerical studies of the Cahn-Hilliard equation for phase separation*, Finite Element Circus, University of Tennessee, November 13-15, 1987.
4. *Numerical studies of the Cahn–Hilliard equation*, University of Michigan, January 15, 1987.
5. *On the convergence of finite element approximations of a relaxed variational problem*, Finite Element Circus, Penn State University, October 27-29, 1988.
6. *Continuous finite element methods that preserve energy properties*, Finite Element Circus, University of Maryland, Baltimore County, November 10-12, 1989.
7. *Numerical analysis of the Cahn–Hilliard equation*, Georgia Tech University, January 12, 1989.
8. *Continuous finite element methods which preserve energy properties*, University of Maryland, Baltimore County, December 16, 1989.
9. *Computations on the Cahn-Hilliard model of solidification*, SIAM Conference on Dynamical Systems, Orlando, May 22-26, 1990.
10. *Continuous finite element methods which preserve energy properties*, Clarkson University, March 16, 1991.

11. *Analysis and computation of solutions to an evolution problem in nonlinear viscoelasticity*, University of Maryland, College Park, April 10, 1991.
12. *Analysis and computation of solutions to an evolution problem in nonlinear viscoelasticity*. Ninth Army Conference on Applied Mathematics and Computing, Minneapolis, June 17-20, 1991.
13. *Analysis and computation of solutions to an evolution problem in nonlinear viscoelasticity*, Second International Conference on Industrial and Applied Mathematics, Washington, D.C., July 8-12, 1991.
14. *Numerical methods for a nonlinear viscoelastic evolution problem*, University of Virginia, September 12, 1991.
15. *Analysis and computation of solutions to an evolution problem in nonlinear viscoelasticity*, Finite Element Circus, Penn State University, November 8-9, 1991.
16. *Numerical methods for a nonlinear viscoelastic evolution problem*, United States Naval Academy, May 14, 1992.
17. *Continuous time Galerkin methods for nonlinear evolution problems*, Tenth Army Conference on Applied Mathematics and Computing, United States Military Academy, June 16-19, 1992.
18. *Analysis and computation of solutions to an evolution problem in nonlinear viscoelasticity*, Durham Symposium on Evolutionary Problems, Durham, England, July 4-14, 1992.
19. *Finite element in time approximations to nonlinear evolution problems*, International Conference on Innovative Methods in Numerical Analysis, Bressanone, Italy, September 7-11, 1992.
20. *Long time behavior of finite element in time approximations to nonlinear evolution problems*, Finite Element Circus, University of Delaware, November 6-7, 1992.
21. *Space-time finite element methods*, University of Louisville, January 14, 1993.
22. *Numerical approximation of a nonlinear evolution problem in viscoelasticity*. Workshop on Mathematical Problems in Viscoelasticity, Center for Nonlinear Analysis, Carnegie Mellon, February 4-6, 1993.
23. *Qualitative properties of numerical approximations of nonlinear evolution problems based on finite element in time discretizations*, Stanford University, February 22, 1993.
24. *Qualitative properties of numerical approximations of nonlinear evolution problems based on finite element in time discretizations*, California Institute of Technology, February 24, 1993.
25. *On the Numerical Approximation of a model for shear band formation*, Eleventh Army Conference on Applied Mathematics and Computing, Center for Nonlinear Analysis, Carnegie Mellon, June 8-10, 1993.
26. *A Finite element method for a system of evolution equations modeling shear band formation*, Progress in the Theory and Application of the Finite Element Method II, Chalmers University of Technology, Gothenburg, Sweden, August 26-28, 1993.
27. *Finite element approximation of an evolution problem modeling shear band formation*, Georgia Tech University, February 11, 1994.

28. *Industrial mathematics*, University of Maryland, Baltimore County, December 16, 1994.
29. *Space-time finite element methods for time-dependent Partial Differential Equations*, Optimization of Finite Element Methods and their Applications (OFEA 95), St.-Petersburg State University, St.-Petersburg, Russia, June 22-29, 1995.
30. *Specialized numerical methods for time dependent partial differential equations*, University of Maryland, College Park, October 5, 1995.
31. *Discontinuous Galerkin method for the forward/backward heat equation*, Finite Element Circus, University of Maryland, Baltimore County, November 13–14, 1995.
32. *A posteriori error estimates for partial differential equations*, United States Naval Academy, November 27, 1995.
33. *Energy preserving time discretization methods based on finite elements*, University of Delaware, April 26, 1996.
34. *A posteriori error estimates for partial differential equations*, University of Akron, February 20, 1997.
35. *Analysis and computation of approximate solutions of a mathematical model of shear band formation*, Special Topics in the Numerical Solution of Differential Equations, University of Maryland, College Park, April 12-13, 1997.
36. *Pointwise a posteriori error estimates for the obstacle problem*, Finite Element Circus, Cornell University, October 10-11, 1997.
37. *Applicable mathematics*, Clarkson University, October 14, 1997.
38. *Pointwise A posteriori error estimates for the obstacle problem*. Special Year in Computational Mathematics, Mittag-Leffler Institute, Sweden, February 1-27, 1998.
39. *A posteriori error estimates for adaptive finite element approximations of the obstacle problem*, Institute for Mathematics and its Applications, University of Minnesota, April 4, 1998.
40. *A posteriori error estimates for adaptive finite element approximations of the obstacle problem*, North Carolina State University, April 14, 1998.
41. *A posteriori error estimates for adaptive finite element approximations of the obstacle problem*, George Mason University, April 17, 1998.
42. *A posteriori error estimates for adaptive finite element approximations of the obstacle problem*, University of Delaware, April 21, 1998.
43. *The evaluation of option prices on baskets via a perturbation approach*, Mathematical Problems in Industry Workshop, University of Delaware, June 15, 2000.
44. *Time discretizations for evolution problems derived with finite element techniques*, University of Kentucky, November 14, 2000.
45. *Numerical approximation of solutions of a nonlinear inverse problem arising in olfaction experimentation*, Midwest Numerical Analysis Conference, May 20-22, 2005 at University of Iowa.

46. *Numerical approximation of solutions of a nonlinear inverse problem arising in olfaction experimentation*, SIAM Annual Meeting, July 12-16, 2005 at New Orleans, LA.
47. *Numerical approximation of solutions of a nonlinear inverse problem arising in olfaction experimentation*, University of Delaware, October 27, 2005.
48. *Numerical approximation of solutions of a nonlinear inverse problem arising in olfaction experimentation*, University of California at Davis April 6, 2006.
49. *Identification of ion channel distributions in olfactory cilia*, SIAM Annual Meeting, July 31-August 4, 2006, Raleigh, NC.
50. *Identification of ion channel distributions in olfactory cilia*, AMS Sectional Meeting, October 20-21, 2006, Cincinnati, OH.
51. *Identification of ion channel distributions in olfactory cilia*, ICIAM, July 16-20, 2007, Zurich, CH.
52. *Weak Coupling Analysis of Rectifying Gap Junctions*, University of California at Davis, August 15, 2007.
53. *On an integro-differential equation model for the spread of alcoholism*, Mathematical-Biology Seminar, University of Cincinnati, October 2008.
54. *Identification of ion channel distributions in olfactory cilia*, IUPUI, April 25, 2008.
55. *On Chen's mathematical model of biofilm growth*, Taft Research Seminar at University of Cincinnati, October 2009.
56. *Identification of ion channel distributions in olfactory cilia*, University of Maryland at Baltimore County, March 22, 2010.
57. *Error Analysis of Meshfree and Discontinuous Galerkin Methods*, Mechanical Engineering at University of Cincinnati, May 7, 2010.
58. *From the Numerical Analysis Bench: Error Analysis of Discontinuous Galerkin Methods*, Wright-Patterson Air Force Base, September 28, 2010.
59. *Analysis of Moving Least Square Meshfree Methods with Diffuse Derivatives and Penalty Stabilization*, Finite Element Circus, IMA, University of Minnesota, November 5-6, 2010.
60. *From the Numerical Analysis Bench: Error Analysis of Discontinuous Galerkin Methods*, University of Kentucky, November 18, 2010.
61. *Numerical approximation of solutions of a nonlinear inverse problem arising in olfaction experimentation*, Conference in honor of Charlie Elliott's 60th Birthday at University of Warwick, June 7, 2011.
62. *From the Numerical Analysis Bench: Discontinuous Galerkin Methods and short analyses*, Wright-Patterson Air Force Base, September 20, 2011.
63. *Mathematical Biosciences at University of Cincinnati*, MBI, Ohio State University, February 12, 2012.
64. *Analysis of Individual-Based Network Models*, Taft Annual Symposium, May 17, 2012.

65. *Inverse Problems in the Biosciences: Introduction, Mathematical Issues, Solution Approximation and Analysis*, Biomedical Engineering Survey (BME 7001), November 2012.
66. *From the Numerical Analysis Bench: Discontinuous Galerkin Methods and short analyses*, Wright-Patterson Air Force Base, September 2012.
67. *Modeling the Spread of Alcohol Abuse – Differential Equations on Networks*, Tennessee State University, April 2013.
68. *From the Numerical Analysis Bench: Chimera Schemes and Localization Techniques*, Wright-Patterson Air Force Base, September 2013.
69. *Inverse Problems in the Biosciences: Introduction, Mathematical Issues, Solution Approximation and Analysis*, Biomedical Engineering Survey (BME 7001), November 7, 2013.
70. *From the Numerical Analysis Bench: Error Analysis of Overset Finite Element Methods for Prototype Aerospace Problems*, Wright-Patterson Air Force Base, August 2014.
71. *Error analysis of stabilized pseudo-derivatives*, NA Day, Wright State, April 25, 2015.
72. *From the Numerical Analysis Bench: Error Analysis of Finite Element Overset Methods*, CCAS Review, Tec-Edge, Dayton OH, May 19, 2015.
73. *From the Numerical Analysis Bench: Error Analysis of Finite Element Overset Methods*, Wright-Patterson Air Force Base, December 10, 2015.
74. *From the Numerical Analysis Bench: Error Analysis of Finite Element Overset Methods*, CCAS Review, Ohio State University, May 16, 2016.
75. *Theoretical Error Analysis of Direct Overset Finite Element Methods*, AIAA Aviation, June 13, 2016.
76. *The spread of alcohol abuse on a network and a Schelling IDE model*, University of Cincinnati Applied Math Seminar, February 10, 2017.

Grant Proposals:

Army Research Office:

- Applied for grants in 1988, 1990, and 1992.
- *Numerical solution of nonlinear evolution equations in applied problems* (1989) — Funded Summers 1990, 1991, and 1992 (\$90,000, ARO-31144-MA).

National Institutes for Health (NIH): Applied for grants in 2006, 2007 and 2008 with Steve Kleene.

National Science Foundation (NSF):

- Applied for grants each year during 1985-1990, 1992, 1996 (two times), 1997, 1998, 2001, 2002, 2004, 2005, 2008 & 2009 (NSF Biology with S. Kleene), 2012 (NSF Engr. With M. Kupferle, B. Vaughan and S. Lim), 2013 (NSF Math-Biol. With B. Vaughan).
- *Numerical analysis of the Cahn-Hilliard equation* (1986) — Funded Summer 1987 (\$9,900, DMS-8702457).

- *Finite element methods for nonlinear partial differential equations* (1987) — Funded Summer 1988 (\$9,247, DMS-8802828).
- *Career Development in Mathematical Physiology* — Funded one year (2002-3) (\$99,216, DMS 0207-145).
- *REU Supplement to Career Development in Mathematical Physiology* – Mentored Sabrina Blakeman in the WISE program (Summer 2003) (\$784).
- *Identification of Ion Channel Distributions in Olfactory Cilia* (co-PI Steve Kleene) — Funded three years 2005-2008 (\$168,247, DMS-0515989).

NIH/NSF: Applied in 2002 (with E. Gruenstein), 2005 (with S. Kleene), 2007, 2008 & 2009 (with S. Kleene and D.A. Edwards; to DMS/NIGMS).

Office of Naval Research - Applied for grants in 1992 and 1994.

Taft Foundation:

- Research Travel Grants 1993 and 1995.
- Summer Research Grants 1994, 1996, 1998 and 2009.
- Sabbatical Grant 1997-8 and 2005-6.
- Summer Research Proposal Development Grant 2001 and 2005.
- Cost-Sharing Proposal Grant 2002.
- Research Seminar: Visiting Scholar Nick Cogan (Florida State) gave a seminar series during the Fall of 2009.
- Taft Center Fellow: *Mathematical and Computational Study of Problems Arising in the Social, Biological and Physical Sciences*, 2010-2011.

University of Cincinnati:

- URC Faculty Research Fellowship — Summer 1993.
- Support for Faculty Development — 1995-6.
- Instructional Technology — Summer 2000.
- URC Interdisciplinary Research Grant (with S. Kleene) 2004-5.
- URC Interdisciplinary Research Grant (with C.C. Ho, E. Gruenstein and A. Minai) 2009-2010.
- URC Interdisciplinary Research Grant (with M. Kupferle, S. Lim, D. Hassett and B. Vaughan) 2011-2012.

Others:

- Part of Environmental Protection Agency Grant (with J. Franco et al) — Autumn and Winter 1992-3.

Graduate Students:

PhD Students:

1. Kristen Fox-Neff, Mathematics, 2011-2015. Thesis titled *Inverse Methods in Parameter Estimation with HIFU Application*. (Co-Advisor Ben Vaughan).
2. Suayip Toprakseven, Mathematics, 2011-2014. Thesis titled *Error Analysis of Extended Discontinuous Galerkin Methods*. (Co-Advisor Ben Vaughan).
3. Jhules Clack, Mathematics 2009-2014. Thesis titled *Theoretical Error Analysis of of LS-PD-MLS Methods for Second Order and Fractional Order Problems with Stabilization*.
4. Mauricio Osorio, Mathematics, 2006-2010. Thesis titled *Error Analysis of a Penalized Diffuse Element Method*.
5. Zeynep Teymuroglu, Mathematics, 2005-2008. Thesis titled *Continuum Models for the Spread of Alcoholism*.
6. Dorjusen Badamdorj, Mathematics 2003-2006. Thesis titled *Mathematical Modeling of Olfactory Cilia*.
7. Jiyeon Oh, Mathematics 2001-2005. Thesis titled *Error analysis of the Exponential Euler Method and mathematical modeling of retinal waves*.

MS Students:

1. Masters thesis advisor for Valsa Varghese, Mathematics, 1997-9. Thesis entitled *Blow-up computations on a class of nonlocal parabolic problems*.

Committees:

- Served on PhD Committees in Engineering for 6 students; Scott Hunter, (Aerospace, 1994-1999), Raja Sengupta (Aerospace, 1994-7), Michel Boufadel (Civil, 1995-8), Glenn Wolfe (ECECS, 2004-Present), Subhadeep Gan (Aerospace 2008-2010), Hatim Alqadah (ECECS 2008-2011), Shardool Chirputkar (Mech. Eng. 2008-2010), Ivonne Rivas (Math. 2009-2011) Angelica Caciado (Math 2012), Miguel Caciado (Math 2012), Shenghe Li (Math (2012).
- Served on Masters Committees in Mathematics for 14 students; Hatim Alqadah (November 2010), Seiki Imamashi (April 2010), Marla Cordray (May 2010), Onur Saglam (UC 2010), Amin Khatami (UC, 2009), Arun Chatterjee (UC, 2004), Lan Dai (UC, 2004), Hewa Chulanama (UC, 2001), Jeff Li (UC, 2001), Igor Shimansky (UMBC, 1996), Raja Sengupta (UC, 1995), and Kostas Vassilakis (CMU, 1989).
- Served on Masters Committees in Engineering for 3 students; Bosui Li (EE, 2001), Hui Fan (Mech. 2001), and Matt Fenwick (CS, 2000).

Service:

Departmental:

Faculty Hiring Committee (CMU (1987-8), Chair (Sookkyung Lim (2006-7)), Member (Benjamin Vaughan (2009-2010))).

Advised Undergraduate Math Majors (1987-90)

Undergraduate Affairs Committee (1990-1, 2008-9)
 Committee to evaluate teaching questionnaires (1991)
 Chairman, Ph.D. Examinations in Numerical Analysis (1991, 1993, 1996, 2001, 2004, 2007-2010)
 Engineering Mathematics Committee (1991-3 (Chair), 1994-5, 1998-Present)
 Taft Postdoctoral Fellowship Selection Committee (1993)
 Taft Conference Committee (1994-5, 1996-7)
 Taft Executive Committee (1994-7, 1998-2001, 2009-Present)
 Taft Center Fellows Committee (Chair – 2012, 2013)
 Taft Conference/Lectures Chair (1997-8)
 Advised Math Graduate Students (1993-Present)
 Executive Committee (1993-4, 1996-7, 2003-4, 2010, 2011, 2013 (Fall))
 RPT Committee (2003-4, 2009-2012)
 Graduate Affairs Committee (1996-7, 2001-2 (Chair), 2008-2010, 2013-14)
 Graduate Student Executive Committee (2004-5, 2007-2010, 2012-13)
 Honors and Awards Committee (1998-9, 2010)
 Graduate Program Director (1999-2001)

Mathematical Sciences Community:

Refereed a total of 76 papers. Journals include:

SIAM Journal of Numerical Analysis (23)
Mathematics of Computation (6)
IMA Journal of Numerical Analysis (6)
Numerical Methods for Partial Differential Equations (5)
Journal of Computational and Applied Mathematics (5)
Applied Numerical Mathematics (4)
Journal of Computational Physics (4)
Computers and Mathematical Applications(2)
Journal for Mathematical Analysis and its Applications (2)
European Journal of Applied Mathematics (1)
Numerical Functional Analysis and Optimization (1)
Numerische Mathematik (2)
Interfaces and Free boundaries (1)
SIAM Journal of Applied Mathematics (2)
SIAM Journal on Dynamical Systems (1)
Bulletin of Mathematical Biology (1)
International Journal of Computer Mathematics (1)
International Journal for Numerical Methods in Engineering (1)
Journal of Advanced Research in Differential Equations (1)
ZaMM Zeitschrift für Angewandte Mathematik und Mechanik (1)
Computational Mechanics (1)
Electronic Journal of Differential Equations (1)
Advances in Difference Equations (1)
 PLOS One (1)
Neural Networks (1)

Finite Elements in Analysis and Design (1)
J. Applied Mathematics (Hindawi) (1)
Applied Mathematical Modeling (Elsevier) (1)
AIAA Aviation Conference Papers (11 papers for two conference)

Reviewed 18 Grant Proposals. Agencies include:

National Science Foundation (16)
Army Research Office (2)
National Science Foundation Review Panel (2006, 2010)
FONDECYT – Funding Agency for Chile (1).

Conferences and Workshops Attended (without giving a lecture):

1. Finite Element Circus, Duke University, April 25-27, 1985.
2. SIAM Conference on Numerical Linear Algebra, Raleigh, North Carolina, April 29, 1985 - May 2, 1985.
3. Finite Element Circus, Brookhaven Lab, Long Island, November 8-10, 1985.
4. Finite Element Circus, Rutgers University, April 17-19, 1986.
5. Advances in Computational Modeling and Numerical Analysis (In honor of Jim Douglas' Jr. 60th birthday.), University of Chicago, September 9-11, 1987.
6. Finite Element Circus, University of Tennessee, November 13-15, 1987.
7. Finite Element Circus, University of Maryland, College Park, May 6-8, 1988.
8. Finite Element Circus, Penn State University, October 27-29, 1988.
9. Finite Element Circus, Purdue University, March 30, 1989 - April 1, 1989.
10. Conference on Symplectic Integration, Cornell University, November 5-9, 1989.
11. Finite Element Circus, University of Maryland, Baltimore County, November 10-12, 1989.
12. Finite Element Circus, Cornell University, April 19-21, 1990.
13. SIAM Conference on Dynamical Systems, Orlando, Florida, May 22-26, 1990.
14. Workshop on the Evolution of Phase Boundaries, Institute for Mathematics and its Applications, University of Minnesota, September 12-16, 1990.
15. Workshop on Connecting with Industry, Institute for Mathematics and its Applications, University of Minnesota, October 12-13, 1990.
16. Conference on Numerical Methods for Partial Differential Equations (In honor of Jim Bramble's 60th birthday.), Cornell University, January 24-27, 1991.
17. Ninth Army Conference on Applied Mathematics and Computing, Minneapolis, Minnesota, June 17-20, 1991.

18. Second International Conference on Industrial and Applied Mathematics, Washington, D.C., July 8-12, 1991.
19. Conference on Nonlinear Analysis, Center for Nonlinear Analysis, Carnegie Mellon, September 24-27, 1991.
20. Finite Element Circus, Penn State University, November 8-9, 1991.
21. Finite Element Circus, United States Naval Academy, Annapolis, March 27-28, 1992.
22. Tenth Army Conference on Applied Mathematics and Computing, United States Military Academy, West Point, June 16-19, 1992.
23. Durham Symposium on Evolutionary Problems, Durham, England, July 4-14, 1992.
24. International Conference on Innovative Methods in Numerical Analysis, Bressanone, Italy, September 7-11, 1992.
25. Workshop on Computational Methods in Materials Science, Center for Nonlinear Analysis, Carnegie Mellon, September 16-18, 1992.
26. Finite Element Circus, University of Delaware, November 6-7, 1992.
27. Workshop on Mathematical Problems in Viscoelasticity, Center for Nonlinear Analysis, Carnegie Mellon, February 4-6, 1993.
28. Designing a Course in Industrial Mathematics for Undergraduates, Institute for Mathematics and its Applications, University of Minnesota, May 15-16, 1993.
29. Eleventh Army Conference on Applied Mathematics and Computing, Center for Nonlinear Analysis, Carnegie Mellon, June 8-10, 1993.
30. Progress in the Theory and Application of the Finite Element Method II, Chalmers University of Technology, Gothenburg, Sweden, August 26-28, 1993.
31. Workshop on the Theory of Plastic Phenomenon, Carnegie Mellon, March 23-26, 1994.
32. Mathematical Modeling for Instructors, Institute for Mathematics and its Applications, University of Minnesota, August 1-19, 1994.
33. Mathematical Problems in Industry, Albuquerque, N.M., June 12-16, 1995. Hosted by Los Alamos National Laboratory and sponsored by Rensselaer Polytechnic Institute and the U.S. Industrial Study Group.
34. Optimization of Finite Element Methods and their Applications (OFEA 95), St.-Petersburg State University, St.-Petersburg, Russia, June 22-29, 1995.
35. Finite Element Circus, University of Maryland (Baltimore County), November 13-14, 1995.
36. Mathematical Problems in Industry, Troy, N.Y., June 10-14, 1996. Sponsored by Rensselaer Polytechnic Institute and the U.S. Industrial Study Group.

37. Special Topics in the Numerical Solution of Differential Equations, University of Maryland, College Park, M.D., April 12-13, 1997.
38. Finite Element Circus, Cornell University, October 10-11, 1997.
39. Special Year in Computational Mathematics, Mittag-Leffler Institute, February 1-27, 1998.
40. Mathematical Problems in Industry, Troy, N.Y., June 8-12, 1998. Sponsored by Rensselaer Polytechnic Institute and the U.S. Industrial Study Group.
41. Mathematical Biosciences Institute, Ohio State University, Workshop on Neuronal Networks, September 2002.
42. New Directions Short Course on Cellular Physiology, June 2003.
43. Mathematical Biosciences Institute, Ohio State University, Workshop on Integro-differential equations, March 2003.
44. SIAM Annual Meeting, 2005, Portland, OR.
45. Mathematical Biosciences Institute, Ohio State University, Workshop on Mathematical Modeling of Biofilms, March 2010.

Teaching:

Taught a wide range of mathematics classes as TA at Cornell (1980-1985), Research Assistant Professor at Purdue (1985-1987), Assistant Professor at Carnegie Mellon (1987-1990), University of Maryland Baltimore County (1995-1996) and University of Cincinnati (1990-Present).

- **Purdue University:** Taught semester classes in Business Calculus, Differential Equations, Numerical Analysis (UG) and PDE & Fourier Analysis.
- **Carnegie-Mellon:** Taught semester classes in Calculus I, Finite Differences (Graduate), Finite Elements (Graduate).
- **University of Maryland Baltimore County:** Pre-Calculus and PDE & Fourier Analysis.
- **University of Cincinnati:** Taught classes in Calculus I, II, III & IV (261-264); Business Calculus I & II (204 & 205); Differential Equations (273); Matrix Methods (276); PDE & Fourier Analysis I & II (554 & 555); Topics in Mathematics I, II, III (155-157); Numerical Analysis at Graduate Level I, II, & III (514-515); Numerical Analysis (UG) (375); Probability & Statistics (361); Mathematical Biology (UG) (377 & 378); Analytical Methods I & II (701 & 702) and Special Topics in Numerical Methods & Mathematical Biology (597, 710, 711, 712).

Established courses in numerical methods for partial differential equations (15-MATH-561), applied mathematics (15-MATH-517) and mathematical biology (15-MATH-562).

Teaching Evaluation Averages at University of Cincinnati:

2016-2017

Course #	Effectiveness	Evaluation	Attitude
6006	4.8	4.9	5.0

2015-2016

Course #	Effectiveness	Evaluation	Attitude
6006	4.9	4.9	5.0
8010	5.0	5.0	5.0

2014-2015

Course #	Effectiveness	Evaluation	Attitude
6006	5.0	5.0	5.0
1014	3.1	3.6	4.0
1014	3.9	4.6	4.2
6007	4.8	4.7	4.9

2013-2014 (Sabbatical in Spring Semester)

Course #	Preparation	Explanations	Timing	Effectiveness
6006	5.0	4.9	4.8	4.9
8010	5.0	4.8	4.8	4.6

2012-2013

Course #	Effectiveness	Evaluation	Attitude
6006	5	4.9	4.8
6012	4.9	4.9	4.9
1062	4.2	4.3	4.7
6007	4.5	4.7	4.8

2011-2012

No Teaching – Taft Center Fellowship.

2010-2011

Course #	Effectiveness	Evaluation	Attitude
514	4.96	4.88	5.00
701	4.74	4.74	4.91
515	5.00	4.93	5.00
561	4.96	5.00	5.00
516	5.00	5.00	5.00

2009-2010

Course #	Effectiveness	Evaluation	Attitude
514	4.96	5.00	5.00
515	5.00	4.93	4.93
516	4.93	4.93	5.00
378	4.33	4.44	4.67

2007-2008

Course #	Effectiveness	Evaluation	Attitude
377	4.63	4.73	4.89

2003-2004

Course #	Effectiveness	Evaluation	Attitude
361	4.69	4.82	4.87

2001-2002

Course #	Effectiveness	Evaluation	Attitude
155	4.22	4.13	4.39

1996-1997

Course #	Effectiveness	Evaluation	Attitude
263	4.81	4.55	4.87
273	4.84	4.80	4.84
276	4.77	4.74	4.95
561	5.00	4.91	5.00
597	5.00	5.00	5.00

1994-1995

Course #	Effectiveness	Evaluation	Attitude
276	4.69	4.64	4.78
561	4.92	4.77	5.00
701	4.60	4.64	4.71
702	4.85	4.70	4.85

1993-1994

Course #	Effectiveness	Evaluation	Attitude
261	3.90	4.13	4.42
262	4.50	4.18	4.63
514	4.42	4.19	4.55
515	4.80	4.80	4.96

1991-1992

Course #	Effectiveness	Evaluation	Attitude
204	4.46	3.86	4.52
375	4.67	4.67	5.00
710	4.53	4.35	4.76
711	5.00	4.80	5.00
712	5.00	4.80	5.00

1990-1991

Course #	Effectiveness	Evaluation	Attitude
204	4.30	3.94	4.42
205	4.54	4.23	4.44
261	4.33	3.93	4.73
262	4.72	4.45	4.90
263	4.72	4.48	4.76
276	4.67	4.52	4.48

Undergraduate Projects:

Capstones (1 credit hour Project):

- Robert Meyer, Daniel Ilg, Edward Pinski and Luke Chapman (2007).
- Luyao Shen (2008).
- Nathan Loyer and Derek Huelsman (2011).
- Colin Craig (2012).

W.I.S.E. Student: Sabrina Blakeman (Summer 2005).