

Mary (Tara) E. Athan

334 Hollowood Dr. • W Lafayette, IN 47906 • (707) 272-2115 • taraathan@gmail.com

Professional Summary:

- Strong interest in geospatial knowledge representation; recent M.S. in Geographic Information Systems (GIS)
- Knowledge of formal logic and mathematical modeling; Ph.D. in Applied Mathematics
- Extensive experience writing technical reports and proposals
- Excels in project planning and project implementation improvements
- Effective member of technical teams
- **Relevant Training and Experience:**

Operating Systems: Windows, Macintosh, Unix/Linux, Windows Server

Computer Languages: CSS, FORTRAN, Java, javascript, Maple, Matlab, OWL, PHP, RDF, Relax NG, SQL, VBA, xhtml, XML, XSD, XSLT

Applications: ArcGIS (Map, Catalog, Toolbox), ArcObjects, Eclipse, GeoServer, GeoTools, GoogleMaps, GRASS, Idrisi, MapServer, MS: {Access, Excel, PowerPoint, Word}, MySQL, NetBeans, OpenLayers, OpenOffice, oXygen, PostGIS, Protege, Quantum GIS, SPSS, SVN

Natural languages: mother tongue: English
beginning: French, German, Mandarin Chinese,
intermediate: Spanish

Professional Experience

Owner, Athan Services, W Lafayette IN (formerly located in Ukiah, CA) 2004 - present

Project Leader, Common Logic/RuleML Alignment Project (<http://wiki.ruleml.org/index.php/MYNG>)

Coordinator, Mendocino County Weed Management Areas

Coordinate project from implementation through ongoing maintenance, with focus on spearheading collaborative efforts to eradicate invasive weeds causing harm to area's economic and environmental resources of lands and waters.

- Collect, manage and analyze GPS data on weed occurrence and impacts

Contract Manager, forestry service companies: manage governmental bid preparations.

Scientific Research Laboratory Experience

Staff Scientist, Los Alamos National Laboratory, 1997-2001

Conducted research and development in the areas of theoretical physics, Bayesian analysis and probabilistic decision support for environmental issues. Supervisor: Diana Hollis

Group Leader and Senior Research Scientist, Battelle Pacific Northwest National Laboratory, Richland, WA 1994-1997

Worked collaborative on interdisciplinary teams researching multi-resolution analysis and probabilistic decision support systems for environmental issues. Supervisor: Chuck Stewart

Academic Experience

Adjunct Mathematics Instructor, Mendocino College, Mendocino, CA 2003-2004
Taught Algebra and Calculus courses. Supervisor: Meredith Randall

Math/Science Teacher, Developing Virtue Girl's School, Talmage, CA 2001-2003
Taught multi grade classes for students in grades 3 through 12, Supervisor: Heng Yin

Assistant Professor of Applied Mathematics, University of Colorado 1990–1994
Conducted mathematics courses for undergraduate and graduate student engineering majors, conducted research in multi-resolution analysis and combustion. Supervisor: Mark Ablowitz

Assistant Professor of Applied Mathematics, Rensselaer Polytechnic Inst. 1990–1994
Conducted mathematics courses for undergraduate and graduate student engineering majors, conducted research in combustion and fluid mechanics. Supervisor: Joe Ecker

Education

Master's in GIS, University of Leeds, 2011. Dissertation: XCLX: An XML-based Common Logic eXtension with Embedded Geography Markup Language Supervisor: Oliver Duke-Williams

Ph.D. Applied Mathematics, California Institute of Technology, 1986. Dissertation: Asymptotic analysis of thin plates under normal load and horizontal edge thrust. Supervisor: Herbert Keller

M.A. Mathematics, University of Texas, Arlington

B.A. Chemistry, Indiana University

- Graduated Phi Beta Kappa

Awards

Cal-IPC Research Volunteer, 2004 - For research on economic impacts of invasive plants
SIAM DiPrima Prize, 1988 (\$1000) - For outstanding Ph.D. thesis in Applied Mathematics.

Society Memberships

California Invasive Plant Council, California Native Plant Society

Publications, Patents, Reviews and Grants (née Mary E Brewster)

Refereed publications:

- *Transfer of Phosphatidylcholine Facilitated by a Component of Human Plasma*, M. E. Brewster, J. Ihm, J. Brainard and J. A. K. Harmony, *Biochem. Biophys. Acta* **529**, 147-159 (1978).
- *Nonlinear Successive Over-relaxation*, M. E. Brewster and R. Kannan, *Numer. Math.* **44**, 309-315, (1984).
- *Global Convergence of Nonlinear Successive Over-relaxation*, M. E. Brewster and R. Kannan, *Computing* **34**, 73-79, (1985).
- *Varying Relaxation Parameters in Nonlinear Successive Over-relaxation*, M. E. Brewster and R. Kannan, *Computing* **34**, 81-85 (1985).
- *A Computational Process for Choosing the Relaxation Parameter in Nonlinear SOR*, M. E. Brewster and R. Kannan, *Computing* **37**, 19-29, (1986).
- *A Stokesian Entry Flow*, A. Moore, V. T. Buchwald and M. E. Brewster, *Q.J.M.A.M.* **43**, 107-133, (1990).
- *Thin Plates and Compressive Membrane Solutions I: Global Breakdown*, M. E. Brewster, *SIAM J. Appl. Math.* **51**, 1255-1283, (1990).
- *Stationary Premixed Flames in a Dual-Source System*, M. E. Brewster, *Comb. Flame* **91**, 99-105 (1992).
- *Thin Plates and Compressive Membrane Solutions II: A Nonexistence Result*, M. E. Brewster, *SIAM J. Math. Anal.* **24**, 634-647, (1993).
- *Dean Vortices with Wall Flux in a Curved Channel Membrane System: 1. A New Approach to Membrane Module Design*, M. E. Brewster, K. Y. Chung and G. Belfort, *J. Memb. Sci.* **81**, 127-137, (1993).
- *Numerical Bifurcation Analysis of a Free-Boundary Problem*, M. E. Brewster, in *Free Boundary Problems: Theory and Applications*, vol. **3**, ed. J. Chadam, (1990), Longman House, London.
- *Stationary Self-Propagating Fronts in Potential Flow*, *Physica D* **79**, 306-319, (1994).
- *Asymptotics of Slow Flow of Very Small Exponent Power-Law Shear-Thinning Fluids in a Wedge*, M. E. Brewster, J. Chapman, W. Dold, A. Fitt and C. Please, *E.J.A.M.* **6**, 559-571, (1995).
- *Dean Vortices with Wall Flux in a Curved Channel Membrane System : 2. The Velocity Field*, K. Y. Chung, M. E. Brewster, and G. Belfort, *J. Memb. Sci.* **42**, 347-358 (1996).

- *A Multiresolution Strategy for Numerical Homogenization*, M. E. Brewster and G. Beylkin, ACHA, **2**(4), 327-349 (1995).
- *Dean Vortices with Wall Flux in a Curved Channel Membrane System : 3. Concentration Polarization in a Spiral Reverse Osmosis Slit*, K. Y. Chung, M.E.Brewster and G. Belfort, J. Chem. Eng. Jap. **31**, 683-693 (1998).
- *Wavelets for Electronic Structure Calculations*, ME Brewster, GI Fann and Z. Yang, J. Math.Chem **22**, 117-142, (1997).
- *Topic IslandsTM-A Wavelet-Based Text Visualization System*, N.E. Miller, P.C.Wong, M.E.Brewster, and H.Foote, IEEE Vis '98 (refereed conference proceedings).
- *A Multiresolution Strategy for Numerical Homogenization of nonlinear ODE's*, G. Beylkin, M.E.Brewster and A. Gilbert, ACHA, **5**(4) 450-486 (1998).
- *Exact and Approximate Dynamics of the Quantum Mechanical $O(N)$ Model*, B. Mihaila, T. Athan, F. Cooper, J. Dawson, and S. Habib, Phys. Rev. D **62**, 125015 (2000).
- *Design and Implementation of Highly Modular Schemas for XML: Customization of RuleML in Relax NG*. T. Athan and H. Boley. 2011. In: F. Olken, M. Palmirani and D. Sottara, eds. Rule-Based Modeling and Computing on the Semantic Web. Springer Berlin / Heidelberg, pp.17-32.

Technical reports and proceedings:

- RPI and University of Colorado Math-in-Industry Workshop reports, including *Flexible Armor*, *Free surface Instabilities in a Homopolar Generator*, *Venous Blood Flow*, *Optimal Disk Head Shapes*, *Quantitative Software Development Modeling*, *Microgravity Combustion of Metals* (1988-present).
- *Flame Burning-Rate Enhancement in a Layered Medium*, ME Brewster, University of Colorado PAM preprint #104, (1993).
- *Quarterly Review of 241-SY-101 Mixer Pump Data*, (December, 1994), (March, 1995), (June, 1995), (September, 1995), (December, 1995).
- *Uncertainty Status of Selected Instruments in Tank 241-SY-101*, ME Brewster, EA Eschbach, ZI Antoniak, PNL-MIT: 013095 (1995).
- *Evaluation of Waste Level Data in Tank 241-SY-101*, ME Brewster, PNL-MIT:031295 (1995).
- *The Behavior, Quantity and Location of Undissolved Gas in Tank 241-SY-101*, M.E.Brewster, N.B.Gallagher, J.D.Hudson, C.W.Stewart, PNL-10681, (1995).

- *Modeling Large Gas Release Events from Dry Waste Tanks*, ME Brewster, R Buckmire, AW Dixon, DA Edwards, AD Fitt, AC Fowler, PD Howell, TG Meyers, S Pelikan, WD Stone, in The Eleventh Workshop on Mathematical Problems in Industry, LA-UR:95-4038 (1995).
- *A Discussion of Some Mechanisms for Sudden Gas Release from Single-Shell Waste Tanks at Hanford*, RT Allemann, ME Brewster, PA Gauglitz, JD Hopkins, JD Hudson, Y Onishi, CS Simmons, CW Stewart, PNL-WTS:101095, (1995).
- *Hydrogen Concentrations in a "Cavern"*, (1995) ME Brewster, PNL-IS:122995 (1995).
- *Prioritization of Single Shell Tanks for Study of Gas Retention and Episodic Release*, ME Brewster, BJ Palmer, PNL-WTS:122295 (1995).
- *Preliminary Comparison of Retained Gas Estimates from Void Fraction Instrument Measurements and Correlations between Level and Pressure in Tanks 241-SY-101, 241-SY 103 and 241-AW-101*, ME Brewster, TR Shippert and PD Whitney, PNL-MIT 020196 (1996).
- *In Situ Rheology and Gas Volume in Hanford Double-Shell Waste Tanks*, CW Stewart, JM Alzheimer, ME Brewster, G Chen, RE Mendoza, HC Reid, CL Shepard, G Terrones, PNNL-11296 (1996).
- *Application of Value of Information to Tank Waste Characterization: A New Paradigm for Defining Tank Waste Characterization Requirements*, LL Fassbender, ME Brewster, AJ Brothers, SW Gajewski, BL Harper, JG Hill, VL Hunter, DA Seaver, TW Wood, , R John, D. von Winterfeldt, T Eppel, JW Ulvila, PNNL 11395, (1996).
- *Outcome-based strategy for Tank Waste Management: A Risk, Technical and Economic Basis for Characterization of Hanford Site Tank Waste*, SD Colson, ME Brewster, RE Gephart, JG Hill, VL Hunter, J Janata, LG Morgan, PNNL-11231 (1996).
- *Comparison of Retained Gas Estimates from Void Fraction Instrument Measurements and Correlations between Level and Pressure in Several Hanford Double Shell Waste Tanks*, HC Reid, ME Brewster, TR Shippert, PD Whitney, TWSMIT:081996, (1996).
- *Estimates of the Frequency of Potentially Hazardous Gas Releases from Hanford Tank Waste*. ME Brewster, PD Whitney, PNL Letter Report, WTSFG96.X.
- *Flammable Gas Data Evaluation Progress Report*, PD Whitney, NE Miller, PA Meyer and ME Brewster, WTSFG96.1. (Feb 1996).
- *Wavelets for Electronic Structure Calculations*, ME Brewster and GI Fann, Proceedings SPIE 2825 pp. 919-928, (1996).
- *Gas Retention and Release Behavior in Hanford Single-Shell Waste Tanks*, CW Stewart, ME Brewster, PA Gauglitz, LA Mahoney, PA Meyer, KP Recknagle, HC Reid, PNNL-11391 (1996).

Mary (Tara) E. Athan • Page 6

- *Gas Retention and Release Behavior in Hanford Double-Shell Waste Tanks*, P.A. Meyer; M.E. Brewster, S.A. Bryan, G. Chen, L.R. Pederson, C.W. Stewart, G. Terrones, PNNL-11536, (1997).
- *Characterization Strategy Report on the Flammable Gas Safety Issue*, CW Stewart et al, PNNL-11531, (1997).
- *The quantum roll in d-dimensions and the large-d expansion*. B. Mihaila, J.F. Dawson, F. Cooper, T. Athan, S. Habib, LAUR-3-98-3411, (1999).
- *RuleML Version 1.0 Specification*, <http://ruleml.org/1.0/> (2012).

Patents

- *Curved Channel Membrane Filtration*, G. Belfort, M. E. Brewster, and K. Y. Chung, US Patent #5204002, granted April 20, 1993.
- *Topic Islands*, M.E. Brewster and N.E. Miller, US Patent # 6,070,133, granted May 30, 2000.

Selected Talks/Posters

- Nonexistence Result for a Singular Perturbation Problem, presented at the First International Conference on Industrial and Applied Mathematics, 1987, Paris.
- Numerical Bifurcation Analysis of Free-Boundary Problems, presented at the 1989 SIAM National Meeting, San Diego and the Conference on Free-Boundary Problems: Theory and Applications, Montreal (1990)
- Wrinkled Flames Induced by Transverse Nonuniformity, presented at Rensselaer Polytechnic Institute (January 1991) and University of Arizona (October 1991.)
- Maintaining Dean Vortex Flow in a Spiral Porous Channel: A New Approach to Membrane Module Design, presented at the Second International Conference on Industrial and Applied Mathematics, (1991), Washington, D.C. and Colorado State University, (1993).
- Numerical Wavelet Methods for Combustion? presented at the University of Colorado Center for Combustion Research seminar, (March 1992.)
- Stationary Flames in a Dual Source System, presented at the University of Colorado-Denver, at the Fall 1992 Meeting of the Western States Section of the Combustion Institute, and at the University of Colorado Center for Combustion Research seminar, (November 1992.)

Mary (Tara) E. Athan • Page 7

- Weakly Nonlinear Analysis of Dean Vortex Flow in Spiral Porous Channels, presented at the AIChE Annual Meeting, (November 1992.)
- Wavelets-on-the-Interval and Applications presented at the University of Nebraska, Lincoln, (February 1993.)
- Corrosion/ Combustion of Alloys presented at the University of Colorado Center for Combustion Research seminar, (April 1993.)
- Homogenization via Multiresolution Analysis invited presentation at the IMA Workshop on Wavelets, Multigrid and Other Fast Algorithms, University of Minnesota, (October, 1994.)
- Numerical Wavelet Methods for Computational Chemistry poster presented at the DOE/OSC Applied Mathematics Workshop in Albuquerque, (March 1995).
- Applied Mathematics at PNL, presented at the University of Washington (October, 1995).
- Retained Gas Estimation in Hanford Waste Tanks, invited presentation, presented at the IMA Workshop on Women in the Mathematical Sciences in Industry, University of Minnesota, (February 1996).
- Wavelets for Electronic Structure Calculations, ME Brewster and GI Fann, poster session at SPIE conference on Wavelets (1996).
- Wavelets for Stochastic Simulation, presented at SNL, LANL, August, 1997.
- Multiresolution Methods for Stochastic Problems, LANL, October, 1998.
- An Overview of Kriging, LANL, November, 1999.
- Spatial Interpolation via Bayesian Wavelet Shrinkage, LANL, March, 2000.
- Bayesian Analysis in Computational Science and Engineering, a mini-symposium at SIAM Conference on Computational Science and Engineering, September, 2000 (organized and chaired).
- Approaches to Assessment of Cumulative Economic Impact of Invasive Plants, poster at Cal-IPC Symposium, October 2004.

Reviews

An Introduction to Wavelets, by Charles K. Chui. SIAM Review 35, p. 312 (1993).

Have reviewed 12 papers for J.Comp.Phys., Am. Math. Monthly, SIAM J. Sci.Stat.Comp., SIAM J. Appl.Math., SIAM J. Math. Anal., SIAM J. Num. Anal., Int. J. High Perf. Comp. Appli. and ACHA and 2 proposals for NSF.

Grants (a partial list)

Common Logic/RuleML Alignment Project, Feb 1, 2011 (\$12,000) - In progress. Supervisor: Harold Boley.

(See <http://wiki.ruleml.org/index.php/MYNG>)

Other Professional Contributions

OASIS LegalRuleML Technical Committee, member