Matthew J. Sottile

Research Interests

Parallel and high performance computing, programming languages, compilers, performance analysis, complex systems, image analysis, graph theory, signal processing.

Education

University of New Mexico, Albuquerque, New Mexico USA

Ph.D., Computer Engineering, May 2006

- Dissertation: "A Measurement and Simulation Methodology for Parallel Computing Performance Studies"
- Advisor: David A. Bader

University of Oregon, Eugene, Oregon USA

M.S., Computer Science, June, 2001

- Thesis: "The Design Of A General Method For Constructing Coupled Scientific Simulations"
- Advisor: Janice E. Cuny

B.S., Mathematics and Computer Science, June, 1999

- Thesis: "A Framework for Building High Performance Computational Servers Using HPC++"
- Advisor: Allen D. Malony

Honors and Awards

National Nuclear Security Administration, Defense Programs Award of Excellence, 2005.

Los Alamos National Laboratory LAAP Award for Clustermatic-based ASCI Lightning supercomputer, 2004.

R&D 100 Award as member of the LANL Cluster Research Team for the Clustermatic cluster software suite, 2004.

Los Alamos National Laboratory LAAP Award for work on 10T "Pink" Linux Cluster, 2003.

Los Alamos National Laboratory LAAP Award for work on Component Programming Models, 2003.

National Nuclear Security Administration, Defense Programs Award of Excellence for work on the Design and Implementation of the Clustermatic suite, 2002.

First place, University of Oregon Department of Computer Science programming contest, 2001.

Graduated with departmental honors, University of Oregon, 1999.

Undergraduate Physics award, University of Portland, 1996.

Academic Experience

Creative and Emergent Technology Institute, Portland, Oregon USA

Research Staff October, 2019 - Present

Development of educational materials and creative technology focused on public awareness of data privacy and rights in the presence of pervasive data collection systems. Organizer and participant in Portland Winter Light Festival interactive art installation (February 2020).

Pacific Northwest College of Art, Portland, Oregon USA

Make+Think+Code Program Staff August, 2018 - September, 2019

Designed and taught workshops for Make+Think+Code program.

- Fall 2018. **Modeling complex systems with agents (DSI521)**
- Spring 2019. **Science of Sound.**

- Spring 2019. **Graphs and Networks.**
- Spring 2019. **Artificial Life.**

Washington State University, Vancouver, Washington USA

Adjunct Faculty **August, 2016 - Present**
Department of Mathematics
Taught undergraduate level courses in mathematics.
- Fall 2016. **MATH 220 Introduction to Linear Algebra.**
- Fall 2017. **MATH 300 Mathematical Computing.**
- Fall 2019. **MATH 300 Mathematical Computing.**

Washington State University, Pullman, Washington USA

Adjunct Faculty **December, 2014 - December, 2015**
Department of Electrical Engineering and Computer Science
Affiliate Graduate Faculty **April, 2015 - Present**
Department of Mathematics
Member of Analysis+Data group. Graduate advising.
- Co-chair: Hoosein Noorazar. (PhD, 2017)
- Chair: Altansuren Tumurbaatar. (PhD, in-progress)

University of Oregon, Eugene, Oregon USA

Adjunct Assistant Professor **March, 2012 - June, 2012**
Adjunct Assistant Professor / Research Associate **September, 2007 - December, 2009**
Department of Computer and Information Science
Taught core graduate and undergraduate courses, as well as multiple seminars. Advised two masters-level students and one Ph.D. student. Served on three Ph.D. student dissertation committees. Obtained external funding from the Dept. of Energy as well as private industry to fund research programs in image and data analysis, compiler construction, and component-based software engineering.
- Spring 2012. **CIS 410-510 Advanced Functional Programming.**
- Fall 2009. **CIS 630 Distributed Systems.**
- Spring 2009. **CIS 198 Introduction to Scientific Programming with Matlab**.
- Spring 2009. **CIS 415 Operating Systems.**
- Winter 2009. **CIS 407/507 Functional Programming.**
- Fall 2008. **CIS 630 Distributed Systems.**
- Spring 2008. **CIS 410/510 Computational Data Science.**
- Winter 2008. **CIS 610 Multicore Systems.**

Courtesy Research Associate **June, 2010 - Present**
Institute of Neuroscience
Collaboration with the Lockery laboratory to build image and video analysis tools for fluorescence microscopy of both restrained and freely crawling nematodes. This work involved the design of algorithms and their implementation in Matlab for use by graduate students within the lab for data analysis.

Research Assistant **March, 1997 - March, 1999**
Graduate Research Assistant **September, 1999 - June, 2001**
Performed research under Dr. Janice E. Cuny and Dr. Allen D. Malony in software infrastructure supporting computational science users in the Geological sciences. Projects included the ViNE web-based laboratory notebook and workflow engine and the INTERLACE environment for coordinating a parallel set of MATLAB instances using concurrency mechanisms provided by the HPC++

language and Nexus/Globus communication infrastructure.

Los Alamos National Laboratory, Los Alamos, New Mexico USA

Research Assistant **March, 1999 - September, 1999**

Student research assistant in the Advanced Computing Laboratory working on two primary projects: the Parallel Application Workspace (PAWS) framework for parallel model coupling, and the SILOON scripting wrapper generator. During this time I also served in a leadership position within the LANL Student Association as Communications Chair.

Professional Experience

Noddle, LLC, Portland, Oregon USA

Co-founder **December, 2016 - Present**

Noddle is a small research and development company with locations in Portland, OR and San Mateo, CA. The current primary project that I am working on at Noddle is the creation of Pyx, a software synthesis tool aimed at automating the optimization of graph analysis programs for execution on special purpose accelerators such as GPGPUs. I am one of the core developers of the Pyx working on static analysis, pattern matching, and code transformation algorithms. I have also developed a suite of libraries in Python for use with Pyx for graph algorithm development (PyxG), graph queries using a derivative of the Datalog language (PyxL), and low-level data parallel array algorithms (PyxArr). I also work on business development for Noddle.

Sailfan Research, Inc., Portland, Oregon USA

Founder and President **June, 2014 - November, 2016**

Founded Sailfan as a data science spin-off from Galois with a goal of exploring primarily commercial, non-government projects in which the core technology is based on expert-guided feature extraction methods. Sailfan was intended to take techniques previously developed in my work within physics, biology, and general image and video analysis and apply them to new domains. Preliminary problems that were the basis of early Sailfan prototypes include retail analytics (including spatial and temporal analysis of how customers interact with retail stores) and electronic fisheries monitoring systems using video for catch verification on vessels. My role within Sailfan included business development, strategy, technical and scientific direction, and management of contractor and developer resources for implementing prototypes.

Galois, Inc., Portland, Oregon USA

Principal Investigator **January, 2010 - May, 2016**

Responsible for coordination of research activities in data science, high performance computing, and scientific computing. Project lead and principal investigator for multiple grants and contracts from the Dept. of Energy, Lawrence Livermore National Laboratory, Sandia National Laboratory, and private industry.

Los Alamos National Laboratory, Los Alamos, New Mexico USA

Technical Staff Member **June, 2001 - January, 2008**

Member of leadership group for Data Driven Modeling and Analysis team as part of the Continuum Dynamics group. Responsible for project leadership in image and data analysis problems in the context of multi-physics simulation code verification and validation activities. Member of the Advanced

Computing Laboratory cluster research team. Responsible for the design and implementation of scalable cluster monitoring software, techniques for the quantification of operating system interference in large-scale parallel computers, and research in programming models for component-based and parallel programming in the context of scientific simulation.

Counterclaim.com, Eugene, Oregon USA

Co-founder **March 2000 - June, 2001**

Co-founder and lead software architect for a small startup providing electronic legal document filing services for law firms and courts. In the early 2000s a national trend towards electronic filing was starting and myself and two recent business and law graduates started this company. The company continued for a number of years after I left as a service provider for small courts around the country.

Blue Cross Blue Shield of Oregon, Portland, Oregon USA

Software Engineering and Database Consultant **June, 1996 - September 1998**

Design and implementation of the first web-based provider directory for BCBSO customers.

Infolab Technologies, Inc., Portland, Oregon USA

Programmer **September, 1994 - June, 1996**

Design and implementation of e-mail and other communication bridges between the Internet and phone-based text pagers.

Books and Book Chapters

M. Sottile (2010) *Cellular Automata.*, In Encyclopedia of Parallel Computing, Edited by David Padua, Springer, ISBN 978-0-387-09765-7

M. Sottile, T. Mattson, C. Rasmussen (2009) *Introduction to Concurrency in Programming Languages.*, Chapman-Hall/CRC Press, ISBN 978-1420072136

R. Bramley, R. Armstrong, L. McInnes, **M. Sottile** (2006) *High-Performance Component Software Systems.*, In Parallel Processing for Scientific Computing, Edited by Michael A. Heroux, Padma Raghavan, and Horst D. Simon, SIAM Press, ISBN 0-89871-619-5

Journal Publications

Hossein Noorazar, **Matthew Sottile**, Kevin Vixie (2018) *A energy-based interaction model for population opinion dynamics with topic coupling.* International Journal of Modern Physics C, Volume 29, Number 11, 2018,
https://www.worldscientific.com/doi/abs/10.1142/S0129183118501152

M. J. Sottile, J. Dagit, D. Zhang, G. Hendry, D. Dechev (2015) *Static Analysis Techniques for Semi-Automatic Synthesis of Message Passing Software Skeletons.* ACM Transactions on Modeling and Computer Simulation, 2015,
https://doi.org/10.1145/2778888

M. J. Sottile, C. E Rasmussen, W. N. Weseloh, R. W. Robey, D. Quinlan, J. Overbey (2013) *ForOpenCL: Transformations Exploiting Array Syntax in Fortran for Accelerator Programming.* International Journal of Computational Science and Engineering (IJCSE), Volume 8, Number 1, 2013, https://doi.org/10.1504/IJCSE.2013.052113

M. A. Abramson, T. J. Asaki, J. E. Dennis, R. Magallanez, **M. J. Sottile** (2012) *An efficient class of direct search surrogate methods for solving expensive optimization problems with CPU-time-related functions.* Structural and Multidisciplinary Optimization, Volume 45, Number 1, Pages 53-64, January, 2012,
https://doi.org/10.1007/s00158-011-0658-3

Kathryn E. McCormick, Bryn E. Gaertner, **Matthew Sottile**, Patrick C. Phillips, Shawn R. Lockery (2011) *Microfluidic Devices for Analysis of Spatial Orientation Behaviors in Semi-Restrained Caenorhabditis elegans.* PLoS ONE, October 12, 2011,
https://doi.org/10.1371/journal.pone.0025710

Serge Faumont, Gary Rondeau, Tod R Thiele, Kristy J Lawton, Kathryn E McCormick, **Matthew Sottile**, Oliver Griesbeck, Ellie S Heckscher, William M Roberts, Chris Q Doe, Shawn R Lockery (2011) *An image-free opto-mechanical system for creating virtual environments and imaging neuronal activity in freely moving Caenorhabditis elegans.* PLoS ONE, September 28, 2011,
https://doi.org/10.1371/journal.pone.0024666

T. J. Asaki, **M. Sottile**, K. R. Vixie, P. Cherepanov (2010) *Image Denoising by Regularization on Characteristic Graphs.* Applied Mathematical Sciences, 2010

C. D. Rickett, S-E. Choi, C. E Rasmussen, **M. J. Sottile** (2006) *Rapid Prototyping Frameworks for Developing Scientific Applications: A Case Study.* Journal of Supercomputing, Volume 36, Number 2, Pages 123-134, 2006,
https://doi.org/10.1007/s11227-006-7953-6

R. Minnich, **M. Sottile**, S. Choi, E. Hendriks, J. McKie (2006) *Right-Weight Kernels: an off-the-shelf alternative to custom Light-Weight Kernels.* ACM SIGOPS Operating Systems Review, Volume 40, Number 2, Pages 22-28, 2006,
https://doi.org/10.1145/1131322.1131331

R. Armstrong, G. Kumfert, L. Curfman McInnes, S. Parker, B. Allan, **M. Sottile**, T. Epperly, T. Dahlgren (2006) *The CCA Component Model for High-Performance Scientific Computing.* Concurrency and Computation: Practice and Experience, Volume 18, Number 2, Pages 215-229, 2006,
https://doi.org/10.1002/cpe.911

C. E. Rasmussen, **M. J. Sottile**, S. S. Shende, A. D. Malony (2006) *Bridging the language gap in scientific computing: the Chasm approach.* Concurrency and Computation: Practice and Experience, Volume 18, Number 2, Pages 151-162, 2006,
https://doi.org/10.1002/cpe.909

A. Malony, S. Shende, N. Trebon, J. Ray, R. Armstrong, C. Rasmussen, **M. Sottile** (2005) *Performance Technology for Parallel and Distributed Component Software.* Concurrency and Computation: Practice and Experience, Volume 17, Number 2-4, Pages 117-141, 2005,
https://doi.org/10.1002/cpe.931

M. J. Sottile, R. G Minnich (2002) *Scale up your monitoring with Supermon.* IEEE Task Force for Cluster Computing Newsletter, Volume 4, Number 1, 2002

A. D. Malony, J. E. Cuny, J. L. Skidmore, **M. J. Sottile** (2000) *Computational experiments using distributed tools in a Web-based electronic notebook environment.* Future Generation Computer Systems, Volume 16, Number 5, March, 2000,
https://doi.org/10.1016/S0167-739X(99)00135-1

Conference Publications

Craig Rasmussen, **Matthew Sottile**, Soren Rasmussen, Dan Nagle, William Dumas (2016) *CAFe:*

Coarray Fortran Extensions for Heterogeneous Computing. In Proceedings of 21st International Workshop On High-Level Parallel Programming Models And Supportive Environments, at the 30th IEEE IPDPS conference, May, 2016, Chicago, IL

Mark Tullsen, **Matthew Sottile** (2016) *Array Types for a Graph Processing Language.* In Proceedings of 2016 Graph Algorithms Building Blocks Workshop ,at the 30th IEEE IPDPS conference, May, 2016, Chicago, IL

Jason Dagit, **Matthew Sottile** (2013) *Identifying change patterns in software history.* In Proceedings of 1st Annual Workshop on (Document) Changes: modeling, detection, storage and visualization (DChanges 2013), at the ACM DocEng 2013 conference, September, 2013

M. J. Sottile, A. Dakshinamurthy, G. Hendry, D. Dechev (2013) *Semi-Automatic Extraction of Software Skeletons for Benchmarking Large-Scale Parallel Applications.* In Proceedings of ACM SIGSIM Conference on Principles of Advanced Discrete Simulation (PADS), May, 2013

G. Hulette, **M. J. Sottile**, A. D. Malony (2012) *Composing Typemaps in Twig.* In Proceedings of 11th International Conference on Generative Programming and Component Engineering (GPCE'12), 2012, Dresden, Germany

G. Hulette, **M. J. Sottile**, A. D. Malony (2012) *A Type-based Approach to Separating Protocol from Application Logic: A Case Study in Hybrid Computer Programming.* In Proceedings of EuroPar, 2012, Rhodes, Greece

M. J. Sottile, C. E Rasmussen, W. N. Weseloh, R. W. Robey, D. Quinlan, J. Overbey (2011) *ForOpenCL: Transformations Exploiting Array Syntax in Fortran for Accelerator Programming.* In Proceedings of 2nd International Workshop on GPUs and Scientific Applications (GPUScA 2011), 2011, Galveston, Texas

C. Rasmussen, **M. Sottile**, G. Kenyon (2010) *Visual Language Recognition with a Feed-Forward Network of Spiking Neurons.* In Proceedings of IADIS International Intelligent Systems and Agents 2010 (ISA 2010) Conference, Pages 26-31, July, 2010, Freiburg, Germany

K. A. Thomas, **M. J. Sottile**, C. M. Salafia (2010) *Unsupervised segmentation for inflammation detection in histopathology images.* In Proceedings of International Conference on Image and Signal Processing (ICISP), June, 2010, Quebec, Canada

G. Hulette, **M. J. Sottile**, B. Allan, R. Armstrong (2009) *OnRamp to CCA: Annotation-driven static analysis and code generation.* In Proceedings of Workshop on Component-Based High Performance Computing (CBHPC 2009), held in conjunction with Supercomputing 2009, 2009, Portland, Oregon

M. J. Sottile, G. Hulette, A. D. Malony (2009) *Workflow representation and runtime based on lazy functional streams.* In Proceedings of Workshop on Workflows in Support of Large-Scale Science (WORKS), held in conjunction with Supercomputing 2009, 2009, Portland, Oregon

S. M. Mayanglambam, A. D. Malony, **M. J. Sottile** (2009) *Performance Measurement of Applications with GPU Acceleration using CUDA.* In Proceedings of International Conference on Parallel Computing, 2009, Lyon, France

A. Salman, A. D. Malony, **M. J. Sottile** (2009) *An Open Domain-extensible Environment for Simulation-based Scientific Investigation (ODESSI).* In Proceedings of International Conference on Computational Science, 2009

G. Hulette, **M. Sottile**, A. Malony (2008) *WOOL: A Workflow Programming Language.* In Proceedings of eScience Conference, 2008

A. Nataraj, A. Morris, A. D. Malony, **M. Sottile**, P. Beckman (2007) *The Ghost in the Machine: Observing the Effects of Kernel Operation on Parallel Application Performance.* In Proceedings of Supercomputing, 2007, Reno, Nevada

A. Nataraj, **M. Sottile**, A. Morris, A. Malony, S. Shende (2007) *TAUoverSupermon: Low-Overhead Online Parallel Performance Monitoring.* In Proceedings of EuroPar, 2007, Rennes, France

M. Sottile, C. Rasmussen, R. Graham (2006) *Co-Array Collectives: Refined Semantics for Co-Array Fortran.* In Proceedings of International Conference on Computational Science (ICCS 2006), 2006, Edited by V. Alexandrov, D. van Albada, P. Sloot, and J. Dongarra

M. Sottile, V. Chandu, D. Bader (2006) *Performance analysis of parallel programs via message-passing graph traversal.* In Proceedings of IPDPS, 2006, Rhodes, Greece

J. A. Green, et. al. (2006) *Optimizing the tracking efficiency for cosmic ray muon tomography.* In Proceedings of IEEE Nuclear Science Symposium Conference Record, 2006

K. Borozdin, et. al. (2005) *Cosmic-ray muon tomography and its application to the detection of high-Z materials.* In Proceedings of 46th Annual Meeting for the Institute of Nuclear Materials Management, 2005

C. Rasmussen, **M. Sottile**, C. Rickett (2005) *A Gentle Migration Path to Component-Based Programming.* In Proceedings of International Conference on Parallel Computational Fluid Dynamics (PCFD), 2005, Washington, DC

K. Borozdin, et. al. (2004) *Information extraction from muon radiography data.* In Proceedings of ISAS/CITSA 2004: International Conference on Cybernetics and Information Technologies, Systems and Applications and 10th International Conference on Information Systems Analysis and Synthesis, Volume 2, Pages 27-30, 2004

M. J. Sottile, R. G Minnich (2004) *Analysis of microbenchmarks for performance tuning of clusters.* In Proceedings of Cluster, 2004, San Diego, CA

C. Rasmussen, **M. Sottile**, J. Nieplocha, R. Numrich, E. Jones (2004) *Co-Array Python: A Parallel Extension to the Python Language.* In Proceedings of EuroPar, 2004, Pisa, Italy

S. Choi, E. Hendriks, R. Minnich, **M. Sottile**, G. Watson (2004) *Pink: A 1024-node Single-System Image Linux Cluster.* In Proceedings of HPC Asia, Myrinet Users Group Workshop, 2004, Tokyo, Japan

S. Shende, A. D. Malony, C. Rasmussen, **M. Sottile** (2003) *A Performance Interface for Component-Based Applications.* In Proceedings of International Workshop on Performance Modeling, Evaluation, and Optimization of Parallel and Distributed Systems, IPDPS'03, 2003, Nice, France

M. J. Sottile, R. G Minnich (2002) *Supermon: A high-speed cluster monitoring system.* In Proceedings of Cluster, 2002, Chicago, Illinois

S. Choi, E. Hendriks, R. Minnich, **M. Sottile**, A. Marks (2002) *Life with Ed: A Case Study of a LinuxBIOS/BProc Cluster.* In Proceedings of 16th Annual International Symposium on High Performance Computing Systems and Applications, 2002, Moncton, New Brunswick, Canada

M. Sottile, A. Malony (1999) *INTERLACE: An Interoperation and Linking Architecture for Computational Engines.* In Proceedings of EuroPar, Pages 135-138, 1999, Toulousse, France

A. Malony, J. Skidmore, **M. Sottile** (1999) *Computational Experiments using Distributed Tools in a Web-based Electronic Notebook Environment.* In Proceedings of HPCN Europe '99, 1999, Amsterdam, The Netherlands

J. L. Skidmore, **M. J. Sottile**, J. E. Cuny, A. D. Malony (1998) *A Prototype Notebook-Based Environment for Computational Tools.* In Proceedings of Supercomputing, 1998, Orlando, Florida

PREPRINTS/ARXIV PAPERS

Nadine Timmermeyer, Stephen A. Banse, Joseph H. North, **Matthew Sottile**, Shawn R. Lockery, Patrick C. Phillips (2019) *An open source microfluidic sorter for Caenorhabditis nematodes.* https://www.biorxiv.org/content/10.1101/780502v1

Hossein Noorazar, **Matthew Sottile**, Kevin Vixie (2017) *Loss of community identity in opinion dynamics models as a function of inter-group interaction strength.* https://arxiv.org/abs/1708.03317

Hossein Noorazar, **Matthew Sottile**, Kevin Vixie (2016) *A energy-based interaction model for population opinion dynamics with topic coupling.* https://arxiv.org/abs/1607.06806

Matthew Sottile (2015) *Blob indentation identification via curvature measurement.* https://arxiv.org/abs/1501.07692

Matthew Sottile, Geoffrey C. Hulette (2013) *Deriving program transformations by demonstration.* https://arxiv.org/abs/1301.4334

PUBLISHED ABSTRACTS

Sean Keeler, Daniel Kiefer, Orion Rust, Nadav Schwartz, **Matthew Sottile**, Jeffery Dalton, Carolyn Salafia (2008) *141: Collagen integrity of the uterine cervix reflects amniotic fluid cytokine profile.* In Proceedings of , Volume 199, Number 6, Pages Supplement A, S52, https://doi.org/10.1016/j.ajog.2008.09.168

Nadav Schwartz, **Matthew Sottile**, Danielle Mandel, Jaclyn Coletta, Ilan E. Timor-Tritsch, Carolyn Salafia (2008) *649: A novel measure of placental vascularity helps predict birthweight variance.* In Proceedings of , Volume 199, Number 6, Pages Supplement A, S186, https://doi.org/10.1016/j.ajog.2008.09.679

Sean Keeler, Daniel Kiefer, Orion Rust, Eran Bornstein, **Matthew Sottile**, Jeffrey Dalton, Carolyn Salafia (2008) *804: A novel method of assessing cervical collagen integrity utilizing image segmentation analysis.* In Proceedings of , Volume 199, Number 6, Pages Supplement A, S227, https://doi.org/10.1016/j.ajog.2008.09.835

Nadav Schwartz, Jaclyn Coletta, Danielle Mandel, **Matthew Sottile**, Ilan E. Timor-Tritsch, Carolyn Salafia (2008) *650: Placenta vascularization potential is already partly determined by 11-14 weeks.* In Proceedings of , Volume 199, Number 6, Pages Supplement A, S186, https://doi.org/10.1016/j.ajog.2008.09.680

POSTERS

Richard Iles, **Matthew Sottile**, Ofer Amram, Eric Lofgren, Craig McConnel (2019) *Adaptive CBPP vaccine decision-making among agro-pastoralists: results from modeling the cognition and decision dynamics in an agent-based model.* In Proceedings of International Society for Economics and Social Sciences of Animal Health, July, 2019, Atlanta, GA

G. Hulette, **M. Sottile**, R. Armstrong, B. Allan (2008) *Using CCA and Onramp to Generate an Application-specific Framework from a Monolithic Application.* In Proceedings of Supercomputing, 2008, Austin, Texas

S. Faumont, G. Rondeau, T. Thiele, **M. Sottile**, J. Zemek, S. R. Lockery (2008) *Simultaneous recording of neuronal activity and behavior in freely crawling worms.* In Proceedings of Neuronal Development, Synaptic Function and Behavior, C. elegans Topic Meeting No. 2, June, 2008, University of Wisconsin-Madison

C. Rasmussen, **M. Sottile**, D. Quinlan, W. Weseloh. (2008) *Fortran+- (extensions and restrictions): Is it time for a new parallel language? Not entirely.* In Proceedings of DOE ASCR PI meeting, March, 2008, Denver, CO

T. Asaki, **M. Sottile** (2005) *DEEPBLUE: A component-based software toolkit for image and shape metrics.* In Proceedings of LANL CCS Division Review, June, 2005

Invited Talks

Matthew Sottile (2020) *Intro to Research in Data Science and Image Analysis.* Data Science and Image Analysis Conference of the Pacific Northwest, Washington State University, February, 2020, Pullman, WA

Matthew Sottile (2020) *Where's my scikit-clean? Addressing the data prep problem.* Data Science and Image Analysis Conference of the Pacific Northwest, Washington State University, February, 2020, Pullman, WA

Matthew Sottile (2020) *Automation in high performance scientific application development.* Portland State University Computer Science Colloquium, February, 2020, Portland, OR

M. Sottile, D. L. Errington (2019) *Deductive program synthesis: computing fast code.* WSU Vancouver Mathematics and Statistics Seminar, November, 2019, Vancouver, Washington

Richard Iles, **Matthew Sottile**, Ofer Amram, Eric Lofgren, Craig McConnel (2019) *Adaptive CBPP and RVf vaccine decision-making among agro-pastoralists: results from modeling the cognition and decision dynamics in an agent-based model.* Social Science for global animal health seminar series, Washington State University, September, 2019, Vancouver, WA

M. Sottile (2019) *A Graph-Theoretic Approach to Setlist Structure Analysis.* 2019 Phish Studies Conference, Oregon State University, May, 2019, Corvallis, OR

M. Sottile, D. L. Errington (2018) *Experiences building deductive code synthesis tools for Python.* Oak Ridge National Laboratory, August, 2018, Oak Ridge, Tennessee

M. Sottile, D. L. Errington (2018) *Pyx - A Software Synthesis Tool for Python.* Lawrence Livermore National Laboratory, CASC Seminar, January, 2018, Livermore, California

M. Sottile (2017) *Opinion dynamics models based on interaction potentials with topic coupling.* WSU Vancouver Mathematics and Statistics Seminar, January, 2017, Vancouver, Washington

M. Sottile (2016) *Opinion dynamics models based on interaction potentials with topic coupling.* OSU Applied Mathematics Seminar, November, 2016, Corvallis, Oregon

M. Sottile, J. Schoonmaker (2015) *There's More to See Than Ever Before, The Growing Need for Visual Data Analytics.* AUVSI Cascade Chapter 2015 Dual Track: Unmanned Systems for Emergency Management and Marine Sciences, October, 2015, Newport, Oregon

H. Sorenson, **M. Sottile** (2015) *Coming Soon - a 'Webby' Store Near You!.* American Marketing Association Analytics with Purpose Conference, March, 2015, San Diego, California

M. Sottile (2015) *Basic Domain Specific Language Concepts in FSharp.* Portland FSharp Meetup Group, January, 2015, Portland, Oregon

M. Sottile (2011) *How many ways can you describe a glass of water (mathematically)?.* Nuts and Bold Ideas Seminar, Portland State University, 2011, Portland, Oregon

M. Sottile (2010) *Lazy functional streams for workflow representation and runtime.* Workshop in Kyoto. Also presented at Tokyo University and Kyoto University, February, 2010

M. Sottile (2008) *CCA On-Ramp.* Quarterly CCA Meeting, July, 2008, Bethesda, Maryland

C. Rasmussen, **M. Sottile**, D. Quinlan, W. Weseloh. (2008) *SAFe Parallel Programming: Single Assignment Fortran.* Microsoft Research, April 18, 2008, Redmond, Washington

M. Sottile (2007) *Image metrics project (U).* Classified presentation, Los Alamos National Laboratory ASC Simulation Verification and Validation program, 2007

M. Sottile (2006) *Image metrics project (U).* Classified presentation, Los Alamos National Laboratory ASC Simulation Verification and Validation program, 2006

M. Gokhale, **M. Sottile** (2006) *Program Analysis Tools for Application Specific Architectures.* LACSI 2006 / PACT 2006 / HPEC 2006, 2006

M. Sottile. (2006) *Comparing Simulated and Experimental Images via Shape Metrics.* Algorithms for Image Analysis in Scientific Data Mini-Symposium, SIAM Imaging Science Conference, 2006, Minneapolis, Minnesota

M. Sottile. (2006) *Exploring performance sensitivity of distributed memory parallel programs to system interference.* SIAM Parallel Processing Conference, February, 2006

M. Sottile. (2005) *Right weight kernel: Introduction, concepts, and current work.* DOE FastOS PI Meeting, June 9, 2005, Rockville, Maryland

M. Sottile. (2005) *CCAIN: Essential CCA.* CCA Quarterly Meeting, April 28, 2005, Lincoln City, Oregon

M. Sottile. (2005) *Analysis of microbenchmarks for performance tuning of clusters.* Colloquium, University of New Mexico, Electrical and Computer Engineering Department, March 25, 2005

C. Rasmussen, **Matthew Sottile** (2004) *Python for High Productivity Scientific Programming.* Los Alamos National Laboratory, November, 2004

S. Choi, E. Hendriks, R. Minnich, **M. Sottile**, G. Watson (2004) *Clustermatic software suite tutorial.* Supercomputing, 2004, Pittsburgh, Pennsylvania

C. Rasmussen, **Matthew Sottile** (2004) *Python for High Productivity Scientific Programming.* LACSI, 2004, Santa Fe, New Mexico

S. Choi, E. Hendriks, R. Minnich, **M. Sottile**, G. Watson (2004) *Clustermatic software suite tutorial.* LACSI, 2004, Santa Fe, New Mexico

S. Choi, E. Hendriks, R. Minnich, **M. Sottile**, G. Watson (2004) *Clustermatic software suite tutorial.* LCI, 2004, Austin, Texas

M. Sottile. (2004) *Formal methods for component design.* Quarterly CCA Meeting, 2004, Boulder, Colorado

M. Sottile. (2004) *Developing a Formal Representation for Component Design Patterns.* SIAM Parallel Processing Conference, February, 2004, San Francisco, California

S. Choi, E. Hendriks, R. Minnich, **M. Sottile**, G. Watson (2003) *Clustermatic software suite tutorial.* LACSI, 2003, Santa Fe, New Mexico

M. Sottile. (2002) *Supermon: Scalable cluster monitoring.* University of New Mexico, Computer Science Department Colloquium, November 5, 2002

M. Sottile. (2003) *PAWS: The parallel application workspace.* ACTS Workshop, Lawrence Berkeley National Laboratory, 2003

M. Sottile. (2002) *PAWS: The parallel application workspace.* ACTS Workshop, Lawrence Berkeley National Laboratory, 2002

M. Sottile. (2001) *PAWS: The parallel application workspace.* ACTS Workshop, Lawrence Berkeley National Laboratory, 2001

M. Sottile. (1999) *Science and Supercomputing.* Student colloquium, Los Alamos National Laboratory, July, 1999

M. Sottile. (2002) *Supermon: A high-speed cluster monitoring system.* Los Alamos National Laboratory, Advanced Computing Laboratory Colloquium, January, 2002

M. Sottile. (2001) *Automated, compiler based methods for coupling parallel simulations.* Los Alamos National Laboratory, Advanced Computing Laboratory Colloquium, March, 2001

Technical Reports

David E. Bernholdt, Benjamin A. Allan, Robert C. Armstrong, Daniel Chavarria-Miranda, Tamara L. Dahlgren, Wael R. Elwasif, Tom Epperly, Samantha S. Foley, Geoffrey C. Hulette, Sriram Krishnamoorthy, Adrian Prantl, Ajay Panyala, **Matthew Sottile** (2012) *COMPOSE-HPC: A Transformational Approach to Exascale.*, Oak Ridge National Laboratory Technical Report, Number ORNL/TM-2012/85

S. DeSalvo, S. Ibrahim, J. Treanor, **M. Sottile** (2007) *Image Processing for C. elegans Movement Video Streams.*, Los Alamos National Laboratory Technical Report, Number LA-UR-07-5069

Academic and Professional Service

Topic Editor for The Journal of Open Source Software (https://joss.theoj.org), 2019-present.

External review committee member

- ACM SIGPLAN conference on Programming Language Design and Implementation (PLDI), 2015.

Program committee member - conferences (reverse chronological order):

- ACM SIGPLAN International Conference on Functional Programming (ICFP) 2014
- IEEE International Parallel and Distributed Processing Symposium (IPDPS) 2014
- IEEE International Conference on Connected Vehicles and Expo (ICCVE) 2013
- Supercomputing 2013 (Performance subject area)

- IEEE International Ubiquitous Computing Conference (IUCC) 2013, 2012, 2011
- International Conference on Parallel Processing (ICPP) 2010
- IEEE International Conference on High Performance Computing and Communications (HPCC) 2009, 2008, 2007, 2006
- CompFrame 2005

Program committee member - workshops (reverse chronological order):

- 2nd International Workshop on GPUs and Scientific Applications (GPUScA), colocated with PACT 2011
- International Workshop on High-Level Parallel Programming Models and Supportive Environments (HIPS), colocated with IPDPS 2010, 2009, 2004
- 9th IEEE International Workshop on Parallel and Distributed Scientific and Engineering Computing (PDSEC) 2008
- Workshop on Operating System Interference in High Performance Applications (OSIHPA), colocated with International Conference on Parallel Architectures and Compilation Techniques (PACT) 2006, 2005

Organizing committee member (reverse chronological order):

- ACM International Conference on Supercomputing 2013, Eugene, OR (Registration Chair).
- HPC Languages and Tools Workshop, Rice University, October 5-6, 2010.
- Mini-symposium on "Algorithms for Image Analysis in Scientific Data", SIAM Imaging Science 2006 conference, Minneapolis, Minnesota.
- Mini-symposium on "Design Patterns for High Performance Component Architectures", SIAM Parallel Processing 2004 Conference, San Francisco, CA, February 2004.

Journal referee:

- Elsevier Journal of Computational Science
- IEEE Transactions on Parallel and Distributed Computing
- IEEE Computer
- IEEE Transactions on Computers
- Journal of Parallel and Distributed Computing

Member of Board of Directors, Sigma Xi Columbia-Willamette Chapter, 2011-present. Chapter Officer as Secretary from June 2014 to June 2015.

Panelist, "Non-Academic Career Paths for Students who Like Mathematics". MAA MathFest 2014, Portland, Oregon. August 2014.

Panelist, "Transition to Multicore". Workshop colocated with SPLASH/OOOPSLA 2011, Portland, Oregon. October 2011.

Proposal reviewer: Dept. of Energy, Office of Science, MICS division (2009)

Core program participant at UCLA IPAM 2007 "Random Shapes" program, "Random and Dynamic Graphs and Networks" and "Image Processing for Random Shapes" workshops.

Participant at UCLA IPAM 2005 summer school on Intelligent Extraction of Information from Graphs and High Dimensional Data.

Participant, "SCaLeS: A Science-Based Case for Large-Scale Simulation" workshop, Arlington, VA., June 2003.

PROFESSIONAL SOCIETIES

- Sigma Xi, Full Member
- American Physical Society (APS)

- Association for Computing Machinery (ACM)
- Society for Industrial and Applied Mathematics (SIAM)
- Institute of Electrical and Electronics Engineers (IEEE)

Creative / Artistic Works

Title: "Light Response".
Description: Interactive art installation as part of the Portland Winter Light Festival. Projected particle system with viewer interaction via light-sensitive sensors, Arduino-based circuitry and Processing code.
Date: February 8, 2020.
Location: "The Riveter", Revolution Hall, Portland, OR.

Title: "Primordial Particle Systems".
Description: Non-interactive projected art installation as part of the Portland Winter Light Festival. Continuous evolving system based on an interacting particle model from the scientific literature. Written in Processing.
Date: February 8, 2020.
Location: "The Riveter", Revolution Hall, Portland, OR.

Other

- US Soccer National "E" Coaching License, December 2015
- US Soccer National "F" Coaching License, August 2015