

Curriculum Vitae

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Brief Research Statement. I perform research in the general area of applied formal methods for software engineering. Subtopics of focus include verification, semantics, distributed object and component-based computing, ubiquitous computing, scientific computing, parallel and concurrent computing, and system and component specification, particularly with regards to system correctness and security. I also have research interests in system modeling, programming languages, compilers, networking, operating systems, graphics, artificial life, education, and ethics.

Brief Teaching Statement. I teach computer science and mathematics. I am a respected speaker in academic and industry settings, I have lectured to thousands of students at all levels over the years, and I receive positive reviews in all my classes. The computer science topics that I enjoy teaching include all topics relating to the fields of formal methods, software engineering, programming languages, distributed systems, operating systems, algorithms, computer graphics, simulation, and artificial life. The mathematics courses that I enjoy teaching include those from the fields of logic, category theory, type theory, proof theory, advanced algebra, and model theory. I am comfortable teaching nearly any undergraduate course in computer science and pure or applied mathematics.

Academic Qualifications

- Ph.D. (computer science) 2002, California Institute of Technology.
Thesis advisers K. Mani Chandy and Jason Hickey and external reader Doug Lea.
- M.S. (computer science) 1998, California Institute of Technology.
- M.S. (computer science) 1995, University of Massachusetts, Amherst.
- B.S. (computer science with honors) 1992, Florida State University.
- B.S. (pure mathematics) 1992, Florida State University.

Teaching

- IT University of Copenhagen. Responsible for postgraduate course *Advanced Models and Programs* in 2012 and co-responsible in 2010 and 2011. Fully responsible for undergraduate course *Analysis, Design, and Software Architecture with Project* and postgraduate course *Project Cluster: Global Software Development*. Instrumental in the evolution of the BSc and MSc programs in Software Development.

- UCD School of Computer Science and Informatics, University College Dublin. Responsible for undergraduate modules *COMP 30010 Foundations of Computing*, *COMP 1002/10050 Software Development*, *COMP 2014/20050 Software Engineering Project II*, *COMP 3013/30050 Software Engineering Project III*, *COMP 20060 Operating Systems*, and a postgraduate module *Software Engineering for Research in Teams*. All of these modules were managed using a [Moodle online learning environment](#) and both a GForge (2004–2007) and a Trac-based (2007–2009) Collaborative Development Environment that I use to manage the modules and their projects. Hundreds of student projects have been developed over a five year timeframe. Instrumental in the design and evolution of the undergraduate and postgraduate curriculum.
- Radboud University Nijmegen and the Technical University/Eindhoven. Co-lecturer for master’s level course with students from industry entitled *Formal Methods in the Software Life Cycle*, 2004.
- California Institute of Technology. Lecturer and Teaching Assistant in *Computer Algorithms* (CS 138), 1997–1998, 1999–2000; in *Distributed Systems Laboratory* (CS 141), 1996–1997, 1998–1999; Lecturer in *An Introduction to Java* taught through the Caltech Technology Learning Center, 1997; Guest Lecturer in *Introduction to Computation* (CS 1), 1999.
- University of California at Los Angeles. Guest lecturer for course *Network Programming in Java*, 1997.
- University of Massachusetts, Amherst. Teaching Assistant in *Databases and Information Systems*, 1992–1993.
- Florida Summer Sciences and Mathematics Camp. Instructor in *Advanced System Programming with X-Windows*, summer 1992.
- Florida State University. Tutor in various courses including *Calculus*, *Linear Algebra*, *Probability*, and *Algebra*, 1988–1992.
- Fort Myers High School. Guest lecturer in *AP Calculus*, 1988, 1989; in *AP Biology*, 1988.

Experience

- Member of [Software Development Group](#) (SDG—primary group), [Programming, Logic, and Semantics Group](#) (PLS), Models Group, Software Engineering Cluster, and the Center for Computer Games Research. [IT University of Copenhagen](#), Associate Professor (tenured), January, 2010–. My extra-research and teaching contributions while at ITU have included: mentoring research grant proposals from the whole of the faculty as a member of many internal grant review boards; guest lecturing in various research groups on time management and previous work in the gaming industry; coauthoring ITU’s response to the government on a new national policy for open access publication; facilitating several *teachIT* workshops; leading the university-wide project “*Open Source Science*” to provide network, software, and development infrastructure support for research and teaching; provide entrepreneurial advice and guidance for students and staff; provide advice and guidance on Open Source Software, licenses, Intellectual Property issues, and similar; provide advice and guidance with regards to interactions with local and international ITU industries; faculty member of the IT Board of the university, which defines the IT Strategy for ITU as well as identifies and prioritizes yearly goals for the IT Department; and faculty representative on the ITU Board of Directors. I have also supervised over two dozen undergraduate and postgraduate student theses in my two years at ITU.

I am an active member of five research groups. I supervise two PhD students (one at ITU and one in Ireland), have one PhD student scheduled to defend, and supervised one postdoc (in Holland), and am currently hiring another several staff as part of my new DSF-funded [DemTech](#) research grant (with Profs. Schürmann, Markussen, Gad, and Boulus). In my first year at ITU I submitted two major national grant proposals, of which one was awarded (DemTech).

- [UCD School of Computer Science and Informatics \(CSI\), University College Dublin](#), Lecturer (tenured), October, 2004–January, 2010.

My School duties included: Chair of Staff-Student Committee, Science Faculty Liaison for Computer Science, Computer Science and Informatics representative for Science Promotion Committee, and I have been a member of the Curriculum Committee, the Teaching and Learning Committee, and the Research and Innovation Committee. I have been responsible all of the end-of-year software engineering project courses, thus I was directly responsible for the bulk of the software engineering education for one-half of the students in the department. I have advised over a dozen fourth year honors student theses, several of which have resulted in published papers at international conferences, three of which won the top prize in computing at UCD, and one of which won the top prize in computing in Ireland. I supervised over a dozen MSc student theses as well. I am also partially responsible for running the CSI programming contest.

My research group, called the [KindSoftware](#) research group, had over a five year timeframe at UCD, three postdocs, six PhD students, over a dozen MSc students, and three research programmers. We focus on software engineering with applied formal methods. We were part of a larger group, which that I co-founded in 2004 with Prof. Paddy Nixon and Dr. Simon Dobson, called the [Systems Research Group](#). At its largest size this group had well over 50 researchers and raised several million euro in funding.

I was also a Principal Investigator in the [UCD CASL](#); a Principal Investigator and leader of the [UCD CASL SenseTile System](#) project; and a Research Investigator in [Lero: The Irish Software Engineering Research Centre](#).

- Co-author of the *KOA Vote Counting System*, with Engelbert Hubbers and Martijn Oostdijk. This system is the primary vote count system for the KOA (Internet voting) system and was used by the Dutch government for the European Elections in June, 2004. All three authors helped design and write the application and I was also responsible for the system unit testing and verification. The system was written in JML and Java and verified with ESC/Java2.
- Project lead on network and external security evaluation of the KOA system for the Dutch government, 2003. Authored original report *Beveiligingsanalyse van Internetstembureau.nl*, the primary third-party security analysis of this Internet voting system.
- [The Digital Security](#) (Formerly known as the Security of Systems or LOOP Group): Formal Methods for Object-Oriented Systems, Postdoctoral Scholar, October, 2002–October, 2004. Performed research in software verification (extended static checking and interactive), programming and specification language semantics, theorem prover interface design and formalization, and more. Responsible for: design and implementation of ESC/Java2 with David Cok (extended static checking-based verification for Java and JML); higher-order and first-order theorem prover design and implementation, design and implementation of ANSI Common Lisp port of the PVS theorem prover (with Cees-Bart Breunesse); design and implementation of Smart Card sniffing software; design, implementation, and verification of KOA (Internet voting) counting software for the Dutch government.

Industry and Entrepreneurial Experience. I have started, help start, and/or run several technology firms over the past dozen years. Some of these companies raised angel funding, others have obtained multiple rounds of venture capital funding. The two companies that made the most impact on the industry are Fulcrum Microsystems (purchased by Intel in Q3 of 2011) and DALi, Inc. I have directly raised approximately \$1M in funds for my firms.

- [Fulcrum Microsystems](#), Research & Development and Business Consultant, 2002–2003.
- [KindSoftware, LLC](#), Founder and Chief Scientist, since 2000.
- [DALi, Inc.](#), Co-founder and Chief Scientist, 1999–2000.

- [Asynchronous Digital Devices, Inc.](#), Technical and Business Adviser, 1999–2002.
- PeeChee, Inc., Co-founder and CTO, 1998.
- [PublicStaticVoidMain, Inc.](#), Technical and Business Adviser, since 1998.
- SeeView, Inc., Technical Adviser, 1999.
- metaGenesis, Inc., Co-founder and CTO, 1996.
- Sprint Multimedia/Internet Division, Senior Consultant and Distributed Systems Architect, 1996.
- Open Software Foundation Research Institute, Senior Research Engineer, 1995.

References. Any of the following researchers would be happy to provide a letter of reference for me. I suggest contacting the following people to find out more about different aspects of my career: *teaching*—Carthy, Chandy, Nixon, Sestoft; *research*—Chandy, Butler, Hickey, Hoare, Jacobs, Jones, Lea, Leavens, Meyer, Sestoft, Shankar, Woodcock; *research fund raising*—Carthy, Nixon, Sestoft; *community involvement*—Carthy, Butler, Hoare, Jones, Meyer, Nixon, Shankar, Woodcock; *leadership*—Carthy, Chandy, Hoare, Nixon, Shankar, Woodcock; *departmental and university-level activities and involvement*—Carthy, Chandy, Jacobs, Nixon, Sestoft. Detailed references below are listed in alphabetical order.

- Dr. Joe Carthy — joe.carthy@ucd.ie — +353 1 716 2481
Senior Lecturer of Computer Science and Head of School
UCD School of Computer Science and Informatics
University College Dublin, Belfield, Dublin 4, Ireland
<http://www.csi.ucd.ie/users/joe-carthy>
- Dr. K. Mani Chandy — mani@cs.caltech.edu — +1 626 395 6559
Simon Ramo Professor of Computer Science, Department of Computer Science
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http://www.cs.caltech.edu/cspeople/faculty/chandy_m.html
- Dr. Tony Hoare — thoare@microsoft.com — +44 (0)1223 479700
Senior Researcher, Microsoft Research Ltd.
Roger Needham Building, 7 J.J. Thomson Avenue, Cambridge, CB3 0FB, UK
<http://research.microsoft.com/%7Ethoare/>
- Dr. Bart Jacobs — bart@cs.ru.nl — +31 24 365 2236
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- Dr. Gary Leavens — leavens@eecs.ucf.edu — +1 407 823 4758
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- Dr. Bertrand Meyer — Bertrand.Meyer@inf.ethz.ch
Chair of Software Engineering, Department of Computer Science
CH-8092 ETH-Zentrum, Zurich, Switzerland
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- Dr. Paddy Nixon — Paddy.Nixon@utas.edu.au — +61 3 6226 2419
Office of the Pro Vice Chancellor for Research, Private Bag 51, The University of Tasmania, TAS
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- Dr. Peter Sestoft — sestoft@itu.dk — +45 72 18 50 83
Professor and Head of Software Development Group, IT University of Copenhagen
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- Dr. Natarajan Shankar — shankar@cs.sri.com — +1 650 859 5272
Computer Scientist, Computer Science Laboratory
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- Dr. Jim Woodcock — jim@cs.york.ac.uk — +44 (0)1904 434335
Anniversary Professor of Software Engineering, Department of Computer Science
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<http://www-users.cs.york.ac.uk/%7Ejim/>

Additionally, I invite you to contact the following individuals about me and my work: Michael Butler, Simon Dobson, John Hatcliff, Cliff Jones, Rustan Leino, Jay Misra, Peter O’Hearn, Erik Poll, and Barry Smyth.

Research Grants

- *DemTech: Trustworthy Democratic Technology*, Det Strategiske Forskningsrødet (co-PI; Prof. Carsten Schuermann project leader), total grant value 17.3M DKK (Q3 2011–Q3 2014)
- *CHARTER: Critical and High Assurance Requirements Transformed through Engineering Rigour*, European Union Framework 7 ARTEMIS joint undertaking, sub-program 1: Design Methods and Tools, UCD portion of funding approx. €150,000, total grant approx. €5.2M (Q2 2009–Q2 2012)
- *UCD CASL SenseTile System*, Science Foundation Ireland Research Infrastructure Equipment grant, UCD funding approx. €720,000 (Q1 2008).
- *The Java Modeling Language Spec-a-thon*, Formal Methods Europe, UCD funding €5,000 (Q1 2008).
- *Science Foundation Ireland UREKA grant “ODCSSS”*, UCD funding approx. €222,915 (Summer, 2007) I am one of 24 principal investigators on the 2007 ODCSSS program, which received a total of €101,661 in funding under the heading “Technologies for Aiding Human Memory” in 2007. ODCSSS is a four-year Summer research program for international graduate students run in collaboration between academics in the University College Dublin and Dublin City University.
- *IRCSET* funding for postgraduate student Fintan Fairmichael, UCD funding approx. €80,000 (Q3 2006)
- *Lero CSET: Irish Software Engineering Research Center*, UCD portion of funding approx. €800,000, total grant approx. €11M (Q4 2005)
- *MOBIUS: Mobility, Ubiquity, Security*, European Union Framework 6 Future and Emerging Technology Global Computing II grant, UCD portion of funding approx. €330,000, total grant approx. €6.25M (Q4 2005–Q4 2009)

- *UCD small equipment seed grant* plus CSI top-up, UCD funding approx. €40,000 (Q4 2006)
- *IRCSET* funding for postgraduate student Alan Morkan, UCD funding approx. €80,000 (Q3 2005)
- Two *Enterprise Ireland International Collaboration grants*, total value approx. €15,000 (2005, 2006)
- **Total personal funding to date as a PI: around €2,750,000**

Selected Publications

My h-index is approximately 13 and my g-index is approximately 19. I have approximately 50 peer-reviewed publications and another 25 industrial publications. I have co-authored papers with around 35 colleagues and have been cited by well over 500 authors well over 2000 times. Those publications below that are marked with a dagger (†) are those that I consider scientific highlights.

• Theses

- (†) *Kind Theory*. Ph.D. Dissertation, California Institute of Technology, Pasadena, CA, 2002.
- *The Specification of Dynamic Distributed Component Systems*. M.S. Thesis, California Institute of Technology, Pasadena, CA, 1998.
- *DECS: A Distributed Enterprising Computing System*. M.S. Thesis, University of Massachusetts, Amherst, MA, 1995.
- *CUI3D: A 3D Interface for the CLAS Detector*. B.S. Honors Thesis, Florida State University, Tallahassee, FL, 1992.

• Journal

- *E-matching for Fun and Profit*, with Michał Moskal and Jakub Łopuszański. *Electronic Notes in Theoretical Computer Science*, Special Issue on SMT Solvers, 2008.
- *Exceptions in Java and Eiffel: Two Extremes in Exception Design and Application*. In C. Dony et al. (Eds.): *Exception Handling*, LNCS 4119, pp. 288–300, 2006.
- *Formalizing the User's Context to Support User Interfaces for Integrated Mathematical Environments*. *Electronic Notes in Theoretical Computer Science*, Special Issue on User Interfaces for Theorem Proving, 2004.
- (†) *An Overview of JML Tools and Applications*, with Lilian Burdy, Yoonsik Cheon, David Cok, Michael Ernst, Gary T. Leavens, K. Rustan M. Leino, and Erik Poll. *International Journal on Software Tools for Technology Transfer*, February, 2005.
- *At the Crossroads of Law and Technology: A Simulated Infringement Case Arising in Cyberspace*, with Vincent Pollmeier, Lena Smith, Roman Ginis, et al, *Loyola Law Review of Los Angeles*, Vol. 33, No. 3, April, 2000.
- *A Framework for Structured Distributed Object Computing*, with K. Mani Chandy, Adam Rifkin, and Daniel M. Zimmerman. *Parallel Computing*, Vol. 24, No. 12–13, 1998.
- *Webs of Archived Distributed Computations for Asynchronous Collaboration*, with K. Mani Chandy, Adam Rifkin, and Daniel M. Zimmerman. *Journal of Supercomputing*, Vol. 11, No. 2, 1997.

• Conference

- *Testing Library Specifications by Verifying Conformance Tests*, with Daniel Zimmerman and Ralph Hyland. *Proceedings of the 6th International Conference on Tests & Proofs 2012*.
- *Toward Instant Gradeification*, with Daniel Zimmerman and Fintan Fairmichael. *Proceedings of the 24th IEEE-CS Conference on Software Engineering Education and Training 2011*.
- (†) *A Verification-centric Software Development Process for Java*, with Daniel Zimmerman. *Proceedings of the International Conference on Software Quality 2009*. Jeju, Korea.

- *Ensuring Consistency between Designs, Documentation, Formal Specifications, and Implementations*, with Fintan Fairmichael. Proceedings of Component-based Software Engineering 2009. East Stroudsburg, PA, U.S.A.
- *CLOPS: A DSL for Command Line Options*, with Mikoláš Janota, Fintan Fairmichael, Viliam Holub, Radu Grigore, Julien Charles, and Dermot Cochran. Proceedings of the IFIP Domain Specific Languages 2009. Oxford, United Kingdom.
- (†) *Secret Ninja Formal Methods*, with Daniel Zimmerman. Proceedings of Formal Methods 2008. Turku, Finland.
- (†) *Reasoning about Feature Models in Higher-Order Logic*, with Mikoláš Janota. Proceedings of Software Product Lines (SPL) 2007. Kyoto, Japan.
- (†) *A Verification-Centric Realization of e-Voting*, with Dermot Cochran and Patrick Tierney. The USENIX/ACCURATE Electronic Voting Technologies Workshop (EVT07). Boston, Massachusetts. August, 2007.
- *Formally Counting Electronic Votes (But Still Only Trusting Paper)*. Proceedings of International Conference on Engineering of Complex Computer Systems (ICECCS) 2007. Auckland, New Zealand.
- *Soundness and Completeness Warnings in ESC/Java2*, with Alan Morkan and Barry Denby. Proceedings of Specification and Verification of Component-based Software (SAVCBS) 2006. Portland, Oregon, 2006.
- (†) *The KOA Remote Voting System: A Summary of Work To Date*, with Alan Morkan, Dermot Cochran, Fintan Fairmichael, Patrice Chalin, Martijn Oostdijk, and Engelbert Hubbers. Proceedings of Trustworthy Global Computing (TGC) 2006. Lucca, Italy, 2006.
- (†) *Beyond Assertions: Advanced Specification and Verification with JML and ESC/Java2*, with Patrice Chalin, Gary T. Leavens, and Erik Poll. Proceedings of Formal Methods for Components and Object (FMCO) 2005. Amsterdam, The Netherlands, 2006.
- *Integrating Static Checking and Interactive Verification: Supporting Multiple Theories and Provers in Verification*, with Patrice Chalin and Clément Hurlin. Proceedings of Verified Software: Tools, Technologies, and Experiences (VSTTE) 2005. Zurich, Switzerland, 2005.
- *Counting Votes with Formal Methods*, with Engelbert Hubbers, Bart Jacobs, and Martijn Oostdijk. (abstract only) In C. Rattray and S. Maharaj and C. Shankland (Eds.), Algebraic Methodology and Software Technology (AMAST'04), Springer LNCS 3116, 2004.
- (†) *ESC/Java2: Uniting ESC/Java and JML: Progress and issues in building and using ESC/Java2 and a report on a case study involving the use of ESC/Java2 to verify portions of an Internet voting tally system*, with David Cok. Proceedings of the International Workshop on the Construction and Analysis of Safe, Secure and Interoperable Smart Devices (CASSIS) 2004. Marseille, France, March, 2004.
- *Improving the PVS User Interface*, with Sam Owre. In Proceedings of User Interfaces for Theorem Proving (UITP at TPHOL), Rome, Italy, September, 2003.
- *Java Program Verification Challenges*, with Bart Jacobs and Martijn Warnier. Proceedings of the First International Symposium on Formal Methods for Components and Objects (FMCO). Leiden, The Netherlands. November, 2002. Springer LNCS 2852.
- *A Cottage Industry of Software Publishing: Implications for Theories of Composition*, with K. Mani Chandy and Paolo Sivilotti. Proceedings of the Third International Workshop on Formal Methods for Parallel Programming: Theory and Applications (FMPPTA). April, 1998.

- **Peer-Reviewed Workshops**

- *Verified Gaming* with Daniel Zimmerman. Proceedings of the 1st Games and Software Engineering Workshop 2011.

- *Verified Visualisation of Textual Modelling Languages*, with Fintan Fairmichael. Proceedings of the OCL Textual Modeling Workshop at MODELS 2010. Oslo, Norway, 2010.
 - *Agile Formality: A "Mole" of Software Engineering Practices*, with Vieri del Bianco and Dragan Stosic. Proceedings of Agile Methods+Formal Methods (AM+FM) 2010. Pisa, Italy, 2010.
 - *Strongest Postcondition of Unstructured Programs*, with Radu Grigore, Julien Charles, and Fintan Fairmichael. Proceedings of Formal Techniques for Java-like Programs (FTJP) 2009. Genova, Italy, 2009.
 - *A Lightweight Theorem Prover Interface for Eclipse*, with Julien Charles. In Proceedings of User Interfaces for Theorem Proving (UITP at TPHOL'08), Montréal, Québec, Canada, 2008.
 - *Kind Theory and Distributed Knowledge Capture*. Workshop on Distributed Knowledge Capture (D-KCAP at K-CAP'03), Sanibel, Florida, October, 2003.
 - *Code Annotations for Knowledge Management*. Workshop on Knowledge Management and the Semantic Web at K-CAP'03, Sanibel, Florida, October, 2003.
 - *Exceptions in Java and Eiffel: Two Extremes in Exception Design and Application*. Exception Handling in Object Oriented Systems: Toward Emerging Application Areas and New Programming Paradigms (ECOOP), Darmstadt, Germany, July, 2003. (A much extended and revised version was consequently published as an invited chapter in a journal issue on exceptions, mentioned above.)
 - *Semantic Component Composition*. Third International Workshop on Composition Languages (WCL2003 at ECOOP), Darmstadt, Germany, July, 2003.
 - *Opportunities and Challenges for Formal Specification of Java Programs*, with Erik Poll. Position paper, Trusted Components Workshop, Prato, Italy, January 2003.
 - *CDL: A Component Description Language*. Proceedings of the COOTS Advanced Topics Workshop: Validating the Composition and Execution of Component-Based Systems, 1999.
 - *A New Construct for Systems Modeling and Theory: The Kind*. Proceedings of the OOPSLA Workshop: Modeling Dynamic/Emergent Distributed Object Systems, 1998.
 - *Leveraging the World Wide Web for the World Wide Component Network*. Proceedings of the OOPSLA Workshop: Toward the Integration of WWW and Distributed Object Technology, 1996.
- **Refereed Papers Published Under My Supervision** I have a non-standard publication policy in my research group. Only papers to which I directly contribute and significantly co-author have my name on them. If I only advise the research, or if I only write a paragraph or two, or revise a paper, then my name is not on the author list. As this policy seems to be very non-standard, below is a list of those publications that I am related to in this fashion.
 - Mikoláš Janota, Goetz Botterweck, Radu Grigore, and Joao Marques-Silva. *How to Complete an Interactive Configuration Process?* International Conference on Current Trends in Theory and Practice of Computer Science (SOFSEM'10).
 - Mikoláš Janota, Victoria Kuzina, and Andrzej Wasowski. *Model Construction with External Constraints: An Interactive Journey from Semantics to Syntax*. ACM/IEEE 11th International Conference on Model Driven Engineering Languages and Systems Fundamental Approaches to Software Engineering (MODELS '08). Toulouse, France. September, 2008.
 - Mikoláš Janota. *Do SAT Solvers Make Good Configurators?* First Workshop on Analyses of Software Product Lines (ASPL'08). Limerick, Ireland, September 12, 2008.
 - Mikoláš Janota and Goetz Botterweck. *Formal Approach to Integrating Feature and Architecture Models*. Fundamental Approaches to Software Engineering (FASE'08). Budapest, Hungary. April, 2008.
 - Radu Grigore and Michał Moskal. *Edit and Verify*. The 6th International Workshop on First-Order Theorem Proving (FTP 2007). Liverpool, United Kingdom. September, 2007.

- Mikoláš Janota, Radu Grigore, and Michał Moskal. *Reachability Analysis for Annotated Code*. The 6th International Workshop on the Specification and Verification of Component-based Systems (SAVCBS 2007). Dubrovnik, Croatia. September, 2007.
- Mikoláš Janota. *Assertion-based Loop Invariant Generation*. The 1st International Workshop on Invariant Generation (WING 2007). Hagenberg, Austria. June, 2007.

• Papers Under Preparation

- *Modeling Test Cases for Voting: Using the Alloy Model Finder to Derive Test Cases for PR-STV Elections* by Dermot Cochran
- *Verification-centric Software Development in Java* with Daniel Zimmerman.
- *Votail: A Formally Specified and Verified Ballot Counting System for Irish PR-STV Elections* with Dermot Cochran (in pre-proceedings of FoVeOOS'10).
- *Validating Semantics* with Josu Martinez.
- *Refinement of Concurrent Models* with Fintan Fairmichael, Daniel Zimmerman, and Stefan Blom.
- *Orchestrating JML* with Josu Martinez.
- *JMLing Orc* with Josu Martinez.

• Technical Reports¹

- *Formal Methods in Software Product Lines: Concepts, Survey, and Guidelines*, with Mikoláš Janota and Goetz Botterweck. Lero Technical Report Lero-TR-SPL-2008-02, University of Limerick, May 2008.
- *Semantic Properties for Lightweight Specification in Knowledgeable Development Environments*, Technical Report NIII-R0420, Radboud University Nijmegen, 2004.
- *Kind Theory and Software Reuse*, Technical Report NIII-R0419, Radboud University Nijmegen, 2004.
- *ESC/Java2: Uniting ESC/Java and JML: Progress and issues in building and using ESC/Java2*, Technical Report NIII-R0413, Radboud University Nijmegen, 2004.
- *Leading to a Kind Description Language: Thoughts on Component Specification*. Caltech Technical Report CS-TR-99-04, Department of Computer Science, California Institute of Technology, 1999.
- *IDebug: An Advanced Debugging Framework for Java*. Caltech Technical Report CS-TR-98-16, Department of Computer Science, California Institute of Technology, 1998.
- *JPP: A Java Pre-Processor*, with Elaine Cheong. Caltech Technical Report CS-TR-98-15, Department of Computer Science, California Institute of Technology, 1998.

• Industry Journals and Magazines

- *JJ, Can a Beginners Language include Design by Contract?*, with David Epstein and John Motil. Dr. Dobb's Journal, April, 2000.
- *Cable Modems: Cable TV Delivers the Internet*, with Christopher Metz. IEEE Internet Computing, 1998.
- *Wavelength Division Multiplexing: Ultra High Speed Fiber Optics*. IEEE Internet Computing, 1998.
- *Naming and Directories*, with Nelson Minar, Mark Baker, and Ron Resnick. CORBA Development, 1998.

¹Only those reports not superseded by any other mentioned publication are listed.

- *The Web as a Distributed Object Infrastructure*, with Mark Baker, Nelson Minar, and Ron Resnick. CORBA Development, 1998.
- *Ubiquitous Object Systems*, with Ron Resnick, Mark Baker, and Nelson Minar. CORBA Development, 1998.
- *A Hands On Look at Java Mobile Agents*, with Daniel M. Zimmerman. IEEE Internet Computing, Vol. 1, No. 4, July/August, 1997. [Online addendum](#).
- *First Applets, Then Beans, What Next?* Javology Magazine, 1996.
- *Sun Muddies the Distributed Java Waters*. Javology Magazine, 1996.

• Industry

- *The Sprint Passport Distributed Systems and Back-Office Infrastructures*. Sprint Corp, Kansas City, MO, 1996.
- *Generic Programming: Method or Myth?* Open Software Foundation Research Institute, Cambridge, MA, 1995.
- *Overview of Java and HotJava*. Open Software Foundation Research Institute, Cambridge, MA, 1995.
- *Security Features of Java and HotJava*. Open Software Foundation Research Institute, Cambridge, MA, 1995.
- *Distributed Computing: Java, CORBA, and DCE*. Open Software Foundation Research Institute, Cambridge, MA, 1995.
- *The Java and HotJava Object Models*. Open Software Foundation Research Institute, Cambridge, MA, 1995.
- *Java Mobile Code*. Open Software Foundation Research Institute, Cambridge, MA, 1995.
- *Distributed Java*. Open Software Foundation Research Institute, Cambridge, MA, 1995.
- *Web Project Research and Implementation Ideas*. Open Software Foundation Research Institute, Cambridge, MA, 1995.
- *HotJava/Ariadne (Java/Talk) Summary and Comparison*. Open Software Foundation Research Institute, Cambridge, MA, 1995.
- *Hewlett Packard-Corvallis Ariadne Browser Project Proposal*. Open Software Foundation Research Institute, Cambridge, MA, 1995.

• Other

- *The Java Modeling Language Reference Manual* (editor, with many others), 2004–.
- The following are all ongoing books that are shipped with [ESC/Java2](#):
 - * *The ESC/Java2 Reference Manual* (editor, with many others), 2004–.
 - * *Extending ESC/Java2*
 - * *The Logics and Calculi of ESC/Java2*
 - * *The Provers of ESC/Java2*
 - * *ESC/Java2 Implementation Notes*
- *The KindSoftware Coding Standard* (extended version of Infospheres Java standard below). KindSoftware, 2001–.
- *The Infospheres Java Coding Standard* (editor, with Daniel M. Zimmerman). The Infospheres Group, Department of Computer Science, California Institute of Technology, 1997.
- *The Infospheres Infrastructure version 1.0 Users Guide* (primary author). The Infospheres Group, Department of Computer Science, California Institute of Technology, 1996.

Books

- *Object, Components, and Frameworks - The Catalysis Approach* (primary technical reviewer). Desmond D'Souza and Alan Wills, Addison-Wesley, 1998. ([CiteSeer](#) [Amazon](#))
- *Industrial Strength Java* (chapter reviewer). New Riders Publishing, 1996. ([Amazon](#))

Patents

- U.S. patent 6,898,791 on the Infospheres Distributed Object System (a precursor to Sun's Jini and ObjectSpace's Voyager).
- Two provisional patents filed in 1999 on software engineering-related technologies have since been dropped due to time limitations.

Awards

- Computer Science Department, Trinity College, Dublin. Invited graduate student sabbatical, 1998.
- California Institute of Technology. Departmental Fellowship, 1996–2002; Nomination for IBM Fellowship (declined), 1996–1997; Nomination for ARPA Fellowship (declined), 1996–1997.
- Florida State University. Member of Upsilon Pi Epsilon (Computer Science Honor Society), 1989–1992.

Group Leadership

- Head of [KindSoftware Research Group](#), IT University of Copenhagen (2010–) and UCD School of Computer Science and Informatics, University College Dublin (2004–2010).
- Co-head of [Systems Research Group](#), UCD School of Computer Science and Informatics, University College Dublin (2004–2010).
- Principal investigator, [UCD CASL](#) (2007–2010).
- Research investigator, [Lero: The Irish Software Engineering Research Centre](#) (2006–2010).
- Principal investigator, [UCD CASL SenseTile System](#) (2008–2010).
- Lead investigator, Dutch National Expatriate Internet Voting Systems security trial, 2003.
- Adviser of numerous undergraduates on special projects. Topics included: software engineering, operating systems, file systems, system security, and many others. Caltech (1996–2002); UCD (2004–2009); ITU (2010–).
- Project manager, *Infospheres Research Group* (1996–1997) including three graduate students, 6–8 undergraduates, and one staff member.
- Co-founder of the *Java ATO* team at the OSF-RI.

Recent and Upcoming Invited Talks

- Speaker at IFIP WG 1.9/2.15 “Verified Software” meeting in York, UK
- Keynote speaker at AVOCS 2010 in Dusseldorf, Germany
- Speaker at DANSAS 2010 and 2011 in Odense, Denmark
- Invited speaker at VSTTE 2010 in Edinburgh, Scotland
- Invited speaker at the GC6 Workshop on “Pilot Projects for the Grand Challenge in Verified Software” at Formal Methods 2008, Turku, Finland, May, 2008. Talk title: “Verified Gaming”

- Invited speaker (with Jim Woodcock and Tony Hoare), British Computer Society GC6 Town Hall meeting, London, England, February, 2008. Talk title: “Program Verification for the Masses”
- Keynote speaker at the ICECCS workshop on “Grand Challenges for Complex Software Verification,” Auckland, New Zealand, July, 2007. Talk title: “Formally Counting Electronic Votes (But Still Only Trusting Paper)”
- Invited speaker, 6th International KeY Symposium, June, 2007. Talk title: “Recent Advances in Extended Static Checking”
- Two invited talks at Newcastle University in May, 2007. Talk titles: “Practical Verification of Java” and “KOA: An Experimental Platform for Trustworthy Computer-based Voting”
- “The Mobius Program Verification Environment,” at the ETAPS 2007 Mobius Tutorial, Braga, Portugal, 2007
- “The Java Modeling Language: An Overview of the Language, its Use, and Tool Support” at the University of Southampton, 2006
- Keynote speaker at ISoLA 2006 in Cyprus, 2006. Talk title: “Program Safety via Programmer Safety”
- “Usable Formal Tools” at the ESF Workshop “Challenges in Java Program Verification” in Nijmegen, The Netherlands, 2006
- Keynote speaker at Automated Formal Methods (AFM) 2006, a FLoC workshop, in Seattle, WA. Talk title: “(Deeply) Integrating Proving and Programming”
- “Where the Rubber Hits the Road: ESC/Java State-of-the-Art Update, Current Challenges, Desires, and Directions & GC6-inspired Activities at UCD” at the Dagstuhl Seminar “The Challenge of Software Verification,” 2006
- “Mobius Tool Development” for the Mobius Annual Meeting, 2006 in Madrid, Spain
- Invited speaker, Verified Software, Tools, Technology, and Experiences (VSTTE) 2005 in Zürich, Switzerland. Talk title: “Integrating Static Checking and Interactive Verification: Supporting Multiple Theories and Provers in Verification”

Public Speaking (non-Conference or Workshop)

- *DOSE/GSD Concretized: Distributed Outsourced Software Engineering/Global Software Development: Case Studies, Lessons Learned, Best Practices* invited talk for course “Distributed Outsourced Software Engineering” at ETH Zurich in November, 2011
- *Democracy as a Critical System* invited talk for course “Software Verification” at ETH Zurich in November, 2011
- *Democracy as a Critical System* invited talk at the Danish Technical University (DTU) in November, 2011
- *Democracy as a Critical System* Department of Computer Science, University of Aarhus, 2011.
- *DALi: Distributed Artificial Life* Center for Computer Games Research, ITU, 2010
- *Grand Challenges in Computing* Research Seminar Series, CSI, UCD, 2008
- *What Does Science Mean to Me?* Short invited talk to incoming first year Science students at UCD. 2007, 2008
- *Distributed Artificial Life*. Colloquium, University of Nijmegen, Department of Computer Science, April, 2003

- *Raising the Bar: Experiences in Introducing Software Engineering into Software Corporations.* [NINJA](#) (Nijmegen alumni group), March, 2003 (invited talk)
- *When Software Cannot Fail.* Computer Science Teacher's Day, Radboud University Nijmegen, Department of Computer Science, March, 2003 (invited talk)
- *Where Did I Put That Lemma?* Foundations Group Colloquium, Radboud University Nijmegen, Department of Computer Science, January, 2003 (invited talk)
- *Experiences in Introducing Software Engineering into Software Corporations.* Colloquium, Radboud University Nijmegen, Department of Computer Science, November, 2002
- *Distributed Artificial Life.* Los Angeles Metaverse Users Group. September, 2002 (invited talk)
- *Using Java for VLSI Development and/or Advanced Open Source Java Software Engineering.* Los Angeles Java Users Group. August, 2002 (invited talk)
- *The Extended BON Design Model Checker.* Eiffel Summit, TOOLS 2001 (invited talk)
- Guest lecturer, CS 134 (*Computing Systems*). Caltech, 2000
- Guest lecturer, CS 1/2/3 (*Introduction to Sequential and Parallel Programming*). Caltech, 1999
- Guest lecturer, CS 138 (*Computer Algorithms*). Caltech, 1999
- *A Theory and Architecture for Open Collaborate Reuse*, Caltech, 1999
- *Jiki Jiki Java.* Trinity College, Dublin, 1999 (invited talk)
- *Jiki Jiki Java.* Microsoft Research, Cambridge, England, 1999 (invited talk)
- *Computer Security.* Caltech, 1999
- *Jiki and Kind.* Caltech, 1999
- *A New Construct for Systems Modeling and Theory: The Kind.* Workshop on Modeling Dynamic/Emergent Distributed Object Systems, OOPSLA, 1998
- *CDL: A Component Description Language.* COOTS Advanced Topics Workshop on Validating the Composition/Execution of Component-Based Systems, 1999
- *The Infospheres Project, NSF Review.* Maui, HI, 1998
- *Distributed Object Technologies and the World Wide Web*, COOTS, 1998 (invited panel member)
- *The Infospheres Project.* Workshop on Compositional Software Architectures, Monterey, CA. 1998
- *Leveraging the World Wide Web for the World Wide Object Network.* The W3C and OMG Workshop on the World Wide Web and Mobile Code, 1996
- Joseph R. Kiniry *The Infosphere Project: Toward a Global Distributed Object Network.* SoCal Workshop: Worldwide Active Object Networks, 1996
- *Java and HotJava*, OSF Research Institute, 1995
- *Viruses, Worms, and Trojan Horses on the Internet.* FSU, 1989

Event Organizer

- Co-organizer (with Gary Leavens, Peter Schmitt, and Robby) of Dagstuhl Seminar "Java Modeling Language" in 2009

- The first, second, and third [JML Spec-a-thons](#), held in Tacoma, Dublin, and Copenhagen, respectively (co-organized with Dr. Dan Zimmerman)
- OOPSLA 2009 tutorial “*Java Modeling Language*” co-organizer
- Tutorial organizer with several others: *Verification-centric Software Development in Java with JML and ESC/Java2* for the following major conferences:
 - [ETAPS 2008](#)
 - [ETAPS 2009](#)
- *A JML Tutorial: Modular Specification and Verification of Functional Behavior for Java*. Invited tutorial in Werner Damm and Holger Hermanns (eds.) *Computer Aided Verification: 19th International Conference, CAV 2007, Berlin, Germany, July 2007, Proceedings*. Volume 4590 of Lecture Notes in Computer Science, Springer-Verlag, 2007
- [Pervasive 2006](#) Doctoral Colloquium organizer
- Tutorial organizer and co-lecturer with Erik Poll and David Cok: *Design by Contract and Automatic Verification for Java with JML and ESC/Java2* for the following major conferences:
 - [ECOOP 2004](#)
 - [ETAPS 2005](#)
 - [FM 2005](#)
 - [ECOOP 2005](#)
 - [ECEC/FSE 2005](#)
 - [FMCO 2005](#)
- OOPSLA. Chair and organizer of workshop *Modeling Dynamic/Emergent Distributed Object Systems*, 1998
- OOPSLA. BoF Chair for session *The Distributed Coalition: Forming a Vision*, 1998

Service

- TCS 2012. Member of Program Committee.
- [GAS 2012](#). Member of Program Committee.
- [SEFM 2012](#), 2011. Member of Program Committee.
- ICECCS 2012, 2011, [2010](#). Member of Program Committee.
- Member of the [ITU Board of Directors](#), which is the superior authority for the university.
- Member of the IT Group for ITU which sets strategy, goals, and priorities for IT infrastructure and support for the university.
- Member of *IFIP Working Group 1.9/2.15 on Verified Software*.
- [FoVeOOS 2011](#) and [FoVeOOS 2010](#). Member of Program Committee.
- Member of [Journal of Object Technology](#) editorial board, 2010–.
- [CBSE 2011](#), [CBSE 2010](#), [2008](#). Member of Program Committee.
- [PMMPS 2010](#). Member of Program Committee.
- [VSTTE 2010](#). Member of Program Committee.

- [SAVCBS 2005, 2006, 2008, 2009](#). Member of Program Committee.
- [RE-VOTE 2009](#). Member of Program Committee.
- Chair of Working Group #4: Tool Integration of the [COST Program Action IC0701 "Formal Verification of Object-Oriented Software"](#) and member of the Management Committee of this Action.
- Member of the Governing Board of the [Grand Challenge 6: Verified Software Repository](#) project.
- [SLE 2008](#). Member of Program Committee.
- [VAMP 2009](#). Member of Program Committee and Organizer.
- [VERIFY 2008](#). Member of Program Committee.
- [WOTE 2008](#). Member of Program Committee.
- [ICTAC 2008](#). Member of Program Committee.
- [OSS 2008](#). Member of Program Committee.
- Member of [JML Consortium](#), 2007–.
- [IFM 2008](#). Member of Program Committee.
- [TOOLS 2007, 2008, 2009](#). Member of Program Committee.
- [SAS II 2007](#). Member of Program Committee.
- [SEFM 2007](#). Member of Program Committee.
- [VERIFY 2007](#). Member of Program Committee.
- [VAMP 2007](#). Member of Program Committee and Organizer.
- [TOPMoDeIS 2007](#). Member of Program Committee.
- [OSS 2007](#). Member of Program Committee.
- [ICTAC 2007](#). Member of Program Committee.
- [ISoLA 2006](#). Member of Program Committee.
- [IFL 2005](#). Member of Program Committee.
- [FTfJP 2004, 2005](#). Member of Program Committee.
- [OOPSLA 2001](#). Member of Program Committee.
- [The Program for Technology and Law](#), Loyola Law School and Caltech. Expert Witness, Adviser, and Participant, 1999–2000.
- [The Non-profit Industry Consortium for Eiffel](#). Board member, 2001–2002. Chair, 2002–2004. NICE is the standards body for the Eiffel language and core libraries.
- University College Dublin, UCD College of Engineering, Mathematical & Physical Sciences “Science Promotion Committee,” 2004–2007.
- University College Dublin, UCD School of Computer Science and Informatics, member of “Research & Innovation” and “Teaching and Learning” committees, 2004–.
- California Institute of Technology. Library Liaison, 1996–2002.

- California Institute of Technology. Volunteer speaker at the Minorities in Science Program, 1997–2001.
- The Distributed Objects mailing lists. Co-founder and moderator, since 1996.
- The Distributed Coalition, Co-founder and Board member, 1997.
- Contributor to several Open Source projects including: Emacs and XEmacs, the JDE, Jacob, Mozilla, the OO-Browser, and others.

Editor

- Journal of Object Technology special issue for FTfJP 2004.

PhD Supervision/Extern/Reader/Committees (3 students and 9 committees)

- Cees-Bart Breunesse, “On JML: topics in tool-assisted verification of Java programs” PhD thesis, Radboud University Nijmegen (external examiner). Supervisor: Bart Jacobs.
- Dermot Cochan, “Formal Specification and Analysis of Danish and Irish Ballot Counting Algorithms” PhD thesis, IT University of Copenhagen. Supervisor: Joe Kiniry. (viva pending)
- Johannes Eriksson, “SOCOS: Tool Support for Invariant Based Programming” PhD thesis, Åbo Akademi University. Supervisor: Ralph-Johan Back.
- Radu Grigore, “The Design and Algorithms of a Verification Condition Generator” PhD dissertation, University College Dublin. Supervisor: Joe Kiniry.
- Mikolas Janota, “SAT Solving in Interactive Configuration” PhD dissertation, University College Dublin. Supervisor: Joe Kiniry.
- Georg Jung, “Structured Interrelations of Component Architectures” PhD thesis, Kansas State University (external examiner). Supervisor: John Hatcliff.
- Humayun Kabir, “Automatic Inductive Theorem Proving and Program Construction Methods Using Program Transformation” PhD thesis, Dublin City University (external examiner). Supervisor: Geoff Hamilton.
- Rosemary Monahan, “Data Refinement in Object-Oriented Verification” PhD thesis, Dublin City University (external examiner). Supervisor: Joseph Morris.
- Mircea Trofin, “Call Graph-Directed Boundary Conditions Analysis in Contextual Composition Frameworks” PhD thesis, University College Dublin (internal examiner). Supervisor: John Murphy.
- Joachim van dem Berg, “Reasoning about Java programs in PVS using JML” PhD thesis, Radboud University Nijmegen (external examiner). Supervisor: Bart Jacobs.
- Martijn Warnier, “Language Based Security for Java and JML” PhD thesis, Radboud University Nijmegen (external examiner). Supervisor: Bart Jacobs.
- Thomas Wilson, “The Omnibus Language and Integrated Verification Approach” PhD thesis, Stirling University (external examiner). Supervisor: Savi Maharaj.

MSc Supervision (current students are labeled with daggers (†) (25 students))

- Alina Arm (A Security Audit of the Norwegian Internet Voting System) (†)
- Kim Nordskov Adelhart and Nedyalko Kargov (Rule Set Proof Carrying Code; aka Formal Methods for Games) (†)

- Radu Mitache (collaborative use of feature modeling applied to Web 2.0 technologies)
- Christian Kroer and Martin Kjær Svendsen (applying SAT and SMT solvers to domain-specific problems previously solved with constraint solvers)
- Asger Jensen (Code Generation from an Abstract State Machine into Contracted C#) (†)
- Alexandru-Florin Iosif-Lazăr and Gabriel Balázs (Code Contracts for UML in Visual Studio) (†)
- Adam Britt (studying the multi-dimensional complexity of kernel-level data-structures in OpenBSD) (†)
- Sieman Baader, “Supporting Programming as a Reflective Activity through Custom Representations” MSc thesis in Design
- Olavur Kjolbro (formally specifying, implementing, and verifying the Danish voting system) MSc thesis in Software Development
- Martin Hansen “MARLLr: Specification Matching for Popular (widely used) Programming Languages” MSc thesis in Software Development
- Divine Jinor “Pro-active Architecture and Implementation of a Secure Online Banking System that Uses Fingerprint Data as Part of Client Side Digital Signatures” MSc thesis in Software Development
- Alan Barrett, “Reasoning about Java Persistence” MSc thesis in Advanced Software Engineering
- Damian Chojna, “Data Stream Processing on Enterprise Integration Platforms” MSc thesis in Advanced Software Engineering (secondary MSc adviser)
- Dermot Cochran, “Secure Internet Voting in Ireland Using the Open Source Kiezen op Afstand (KOA) Remote Voting System” MSc thesis in Advanced Software Engineering
- Robin Green, “Verified Monadic Programming” MSc thesis
- Alan Hicks, “Tool-assisted Code Splitting for GWT” MSc thesis in Advanced Software Engineering
- Iain Hull, “Automated Refactoring of Java Contracts” MSc thesis in Advanced Software Engineering
- Ralph Hyland, “A Process for the Specification of Core JDK Classes” MSc thesis in Advanced Software Engineering
- Aidan Morrissey, “Automatic Static Class Generation from Informal BON Class Charts to Formal Textual BON Notation” MSc thesis in Advanced Software Engineering
- Ciaran Palmer, “SensorML on SenseTile” MSc thesis in Advanced Software Engineering (secondary MSc adviser)
- Ralph Skinner, “An Integrated Development Environment for Business Object Notation” MSc thesis in Advanced Software Engineering
- Murat Torlakcik, “Contracts in OpenBSD” MSc thesis in Advanced Software Engineering

BSc Supervision (26 students)

- Anders Oland (Real-time Polyphonic Pitch Detection for Harpsichord)
- Nikolaj Aaes and Nicolai Bo Skovvart (An Open Source Digital Voter List System with a Verified Secure Architecture).
- Sune Alkærsig and Thomas Didriksen (Specifying and Reasoning with Textual BON in Eiffel Studio)
- Soren Engel (A Java VM Backend for the Eiffel Studio Compiler)

- Anders Host Kjærgaard (Flatland - Abbott's Flatland using Artificial Life)
- Anders Bech Mellson (Immediate Connection between Creator and Creation)
- Benjamin Ma and Peter Olsted (God Algorithm for Living Artificial Physic-based Adapting Creatures with Omnipotent Scalability, aka Ambulatory Artificial Saurians)
- Kristan Spencer and Michael Bo Magling (Developing an Editor and Game Engine for a classic JRPG system, aka DSLs for RPGs Design and Development)
- Elliott Bartley, "R.E.A.L." BSc final year project (supervisor).
- Eva Darulová, "Beetz - BON Software Model Consistency Checker for Eclipse" BSc final year project (supervisor).
- Barry Denby, "Automatic Soundness and Completeness Warnings in ESC/Java2" BSc final year project (supervisor).
- Jakub Dostál, "Navigating Large Source Files Using a Fisheye View" BSc ODCSSS Summer internship (supervisor).
- Fintan Fairmichael, "Full Verification of the KOA Tally System" BSc final year project (supervisor).
- Robert Finlay, "A PVS Eclipse Plug-in" BSc final year project (supervisor).
- Conor Gallagher, "Checking JML Specification Soundness using ESC/Java2" BSc final year project (supervisor).
- Daragh Hurley, "A CLR Back-end for a FLOSS Eiffel" BSc final year project (supervisor).
- Clément Hurlin, "Verification Condition Generator for ESC/Java2" Summer internship (supervisor).
- Niall OHiggins, "Bugs in OpenBSD" BSc final year project (supervisor).
- Rory McCann, "An Eiffel Plug-in for Eclipse" Summer internship (supervisor).
- Alan E. Morkan, "KOA Evaluation, Demonstration Installation and Implementation" BSc final year project (supervisor).
- Anara Sandygulova, "SenseTile in the City: RoadWær" BSc ODCSSS Summer internship (supervisor).

Technical Reviewer (partial list, not including PC memberships)

- *Journals*: IEEE Computer, IEEE Computing in Science and Engineering, IEEE Concurrency, IEEE Software, IEEE Transactions on Parallel and Distributed Systems, and IEEE Transactions on Software Engineering, Formal Aspects of Computer Science, Software: Practice and Experience, Journal of Object Technology, Journal of Symbolic Computing.
- *Magazines*: IEEE Internet Computing.
- *Conferences*: ASE, ECOOP, FM, FMPPTA, HICSS, HPDC, ICDCS, IPPS, ISHPDC, Pervasive, PODC, SPDP, VSTTE.

Professional Society Memberships

- Active professional member of the [Association for Computing Machinery \(SIGACT, SIGCAS, SIGCSE, SIGPLAN, SIGSOFT, and SIGWEB\)](#), the [IEEE Computer Society](#) (Computer Languages, Distributed Processing, Mathematical Foundations of Computing, and Software Engineering Technical Committees), the [IEEE](#), the [AMS](#), [USENIX](#), [SIAM](#), the [MAA](#), [Eiffel-NICE](#), and the [AAAS](#).

Software Systems

- *AutoGrader*. The AutoGrader is an Eclipse plugin that automatically grades a Java software project based upon guidelines specified by an instructor. To do so it analyzes the output of other Eclipse plugins (static checkers, dynamic checkers, verification tools, test output, etc.) and automatically grades these results, then combines those grades into a final grade. (supervisor) 2009–.
- *Beetlz*. Beetlz is a consistency (refinement) checker for BON, the Business Object Notation (BON), and JML-annotated Java. It was originally developed as part of an undergraduate final year project. Beetlz reads JML-annotated source files and BON specifications as input and returns feedback on whether and where they are inconsistent. The tool is available in a command-line and in a Eclipse plugin version. (supervisor) 2009–.
- *BONc*: A parser, typechecker, and documentation generator for the textual Business Object Notation (BON), 2007–.
- *CLOPS*. CLOPS is a Java framework for painless handling of command line options in Java applications. It consists of a code generator and a runtime library. (supervisor) 2009–.
- *DiVS*. DiVS is a formally specified and validated implementation of the Danish vote counting scheme. (co-supervisor with Dermot Cochran) 2010–
- *ESC/Java2*: The Open Source Extended Static Checker for Java (version 2), ([Nijmegen site](#)) Summer 2003–.
- *FreeBoogie*: An open source alternative to the Boogie backend of the Spec# system, 2007–
- *The JML Tool Suite*: The main core JML2 tool suite including a typechecker, compiler, runtime assertions checker, unit test generator, and documentation generator, 2002–.
- *KOA*: Kiezen op Afstand (KOA) is a Free Software Electronic/Remote/Internet Voting System developed for the Dutch government in 2003. A version of this system was used in the European Parliamentary election of June 2004 and was subsequently released under the GNU General Public License. 2003–.
- *The Mobius Logging Systems (aka IDebug)*: An advanced, concurrent, distributed debugging framework for Java, 1999–.
- *The Mobius Program Verification Environment*. The Mobius verification environment supports the development of specifications, programs and proofs of their security properties. It supports both Java source code and bytecode level verification and is able to produce PCC certificates. The Mobius PVE is built on top of the Eclipse platform. (project lead and co-author) 2006–.
- *RCC: the Race-Condition Checker for Java*. Statically checks (optionally annotated) Java source code for concurrency race conditions. Includes an Eclipse plugin and a Java 1.5 memory model-aware tool. (supervisor) 2008.
- *Rexastor*. Rexastor is a tool for automatic generation of Extended Abstract Syntax Trees (XASTs) in Java. Unlike many other code generators, Rexastor preserves type safety and code reuse across similar AST. (supervisor) 2009–.
- *SATConfig*. SATConfig is a tool for performing configurations of given in a Conjunctive Normal Form using a SAT solver. (supervisor) 2009–.
- *SenseTile*. The UCD CASL SenseTile System is a large-scale, general-purpose sensor system installed at the University College Dublin in Dublin, Ireland. Our facility provides a capability, unique in the world in terms of its scale and flexibility, for performing in-depth investigation of both the specific and general issues in large-scale sensor networking. (project lead and co-author) 2009–.

- *Simplify*. The most popular first order theorem prover for software verification in the world. Includes an Eclipse plugin. (maintainer) 2006–
- *Ulioch*. Ulioch is a model checking-based test generator for parameterized voting schemes, including PR-STV. (supervisor) 2010–.
- *Votail*. Votail is a model-based formal specification and implementation of the Irish PR-STV voting scheme which has been formally validated and verified. (supervisor) 2008–.

Ancient History

- *Open Source PVS 4*: ANSI Open Source Common Lisp port of PVS 3, 2003.
- *PVS*: Semantical User-Interface extensions for PVS 3, 2003.
- *The Extended BON Tool Suite*: A design model checker for a research extension to the BON specification language, 2001.
- *OBJ3*: A specification and proof system for order sorted algebras (maintainer and developer), 2000–.
- *Jiki*: A distributed component-based Java wiki, 1998–2000.
- *SmallEiffel for the AmigaDE/intent* (port co-author and maintainer), 2000.
- *KindFTP*: A full component-based client and server implementation of the FTP protocol for Java, 1999.
- *The Infospheres Infrastructure*: A massively scalable distributed systems infrastructure, 1996–1998.
- *JJ*: Co-designer of procedural and object-oriented programming language for instruction, 1998.
- *PeeChee*: A peer-to-peer distributed system for data and metadata, 1999.
- *Distributed Java Beans* (assisting Dr. Bruce Char): Extending the event system of the Java Beans component model to distributed systems, 1998.
- *Group History Grapher Browsing Associate*: An HCI application that worked with Netscape and Ariadne to support smart management of browsing history. OSF-RI, 1995.
- *Ariadne*: A research web browser written in C++, C, and Ilog Talk (a Lisp dialect). (co-author) OSF-RI, 1995.
- *Escher: An OpenGL API implementation for UNIX*. (sole author) UMass, Amherst, 1994–1995.
- *DECS: A Distributed Enterprising Computing System* (a C-based metacomputing framework). (sole author) UMass, Amherst, 1994–1995.
- *Parallel Fortran*: A Fortran front-end for the GCC compiler. (sole author) UMass, Amherst, 1995.
- *CUI3D: A 3D interface for a detector in the Thomas Jefferson National Accelerator Facility's Particle Accelerator*. (sole author) FSU, 1992.
- *ScapGen*: One of the world's first 3D fractal landscape generators for the Amiga. (sole author) 1989.

Numerous contributions to various Open Source software systems (e.g., Emacs, GCC, Linux, etc.) have also been made since around 1989.