

Dr. C. Jules White

Assistant Professor of Computer Science
 Electrical Engineering and Computer Science
 Vanderbilt University
 (/vanderbilt)

www.magnum.io (http://www....

Dr. Jules White is an Assistant Professor of Computer Science in the Dept. of Electrical Engineering and Computer Science at Vanderbilt University. He was previously a faculty member in Electrical and Computer Engineering at Virginia Tech and won the Outstanding New Assistant Professor Award at Virginia Tech. His research has won 5 Best Paper and Best Student Paper Awards. He has also published over 85 papers.

Dr. White's research focuses on securing, optimizing, and leveraging data from mobile cyber-physical systems. His mobile cyber-physical systems research spans four key focus areas: (1) mobile security and data collection, (2) high-precision mobile augmented reality, (3) mobile device and supporting cloud infrastructure power and configuration optimization, and (4) applications of mobile cyber-physical systems in multi-disciplinary domains, including energy-optimized cloud computing, smart grid systems, healthcare/manufacturing security, next-generation construction technologies, and citizen science.

Dr. White's research has been licensed and transitioned to industry, where it won an Innovation Award at CES 2013, attended by over 150,000 people, was a finalist for the Technical Achievement Award at SXSW Interactive, and was a top 3 for mobile in the Accelerator Awards at SXSW 2013. His research is conducted through the Mobile Application computing, optimization, and security Methods (MAGNUM) Group at Vanderbilt University, which he directs.

Through his research efforts in model-driven engineering, **Dr. White became the project leader of the Eclipse Foundation's Generic Eclipse Modeling System (GEMS)**. GEMS is a part of the Eclipse Modeling Project that also contains the Eclipse Modeling Framework (EMF). GEMS is distributed by over 45 mirrors in North America, Europe, Asia, and South America. The development of GEMS has been **supported by industrial partners, such as IBM, Lockheed Martin, Raytheon, and PrismTech.**

In collaboration with Lockheed Martin Aeronautics, Dr. White has developed highly scalable particle swarm optimization techniques for optimizing the deployment of software in real-time aeronautics platforms to reduce network traffic. Initial results from applying his algorithms to a representative aeronautics platform have shown the potential to reduce network traffic by over 25% and overall hardware footprint by ~40%. Dr. White has also worked on deployment modeling and optimization projects in the automotive and medical imaging domains for Siemens AG. Dr. White's current work on deployment optimization for multi-core processors is **supported by the National Science Foundation, Lockheed Martin, and the Air Force Research Laboratories.**



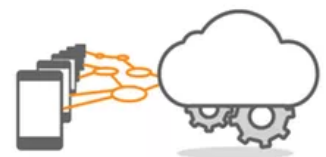
Capstone MOOC for "Android App Development"
 (/learn/aadcapstone)
 Always Open



Android App Components and Data Persistence
 (/learn/androidapps)



Building and Deploying Android App Projects
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Programming Cloud Services for



Dr. Jules White

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Awards

1. Virginia Tech Outstanding New Assistant Professor
2. 2013 Consumer Electronic Show (CES) Innovation Award for HD4AR (commercialized as PAR Works)
3. 2013 Technical Achievement Finalist for HD4AR at SXSW (commercialized as PAR Works MARS)
4. 2013 Accelerator Award Finalist for HD4AR at SXSW (commercialized as PAR Works MARS)

5. Best Paper Award, International Conference on Software Product-lines
6. Best Paper Award, International Conference on Construction Applications of Virtual Reality
7. Best Paper Award, ASCE International Workshop on Computing in Civil Engineering
8. Best Presentation Award, International Conference on Future Computers and Communications
9. Best Student Paper Award, 2013 IEEE International Symposium on Parallel and Distributed Processing with Applications
10. Best Student Paper Award, International Conference on Pervasive and Embedded Computing and Communications
11. Virginia Tech Student Engineering Council Finalist for the Undergraduate Research Advisor Award
12. Virginia Center for Innovative Technology GAP 50 Entrepreneur Award Finalist
13. Taxi Project, CS 279, Finalist in the 2014 Multi-city Innovation Campaign
14. Indoor Navigation Project, Tied for 1st in the 2014 Multi-city Innovation Campaign

Research Interests

1. Mobile Security
2. Mobile Augmented Reality
3. Cyber-physical Systems
4. Deployment and Configuration Optimization
5. Distributed Systems and Cloud Computing

Educational Background

1. Dec. 2008 - Ph.D., Computer Science, Vanderbilt University
2. May 2006 - MS, Computer Science, Vanderbilt University
3. May 2001 - BA, Computer Science, Brown University

Research Commercialization & Faculty Entrepreneurship

1. Co-founder & CTO, Optio Labs, \$12.5M in venture funding
2. Co-founder & Chief Scientist, PAR Works, \$1M Seed Round from Allied Minds Inc.

Massively Open Online Courses (MOOCs)

1. First Coursera Trans-institutional MOOC on Mobile Cloud Computing, https://www.coursera.org/specialization/mobilecloudcomputing/2?utm_medium=listingPage
2. {"Pattern Oriented Software Architectures"=>"Programming Mobile Services for Android Handheld Systems, 90,000 students, 2014, <https://www.coursera.org/course/posa>"}
3. Programming Cloud Services for Android Handheld Systems, 78,000 students, 2014, <https://www.coursera.org/course/mobilecloud>

Appointments

1. 2013-present, Assistant Professor, Electrical Engineering and Computer Science, Vanderbilt University
2. 2015-present, Chief Scientist, Optio Labs
3. 2012-present, Chief Scientist, Cloudpoint
4. 2014-present, Board Member, KTK-Belt Foundation

5. 2012-2015, Chief Technology Officer, Optio Labs
6. 2010-2013, Assistant Professor, Electrical and Computer Engineering, Virginia Tech
7. 2011-2012, Visiting Scientist, Software Engineering Institute, Carnegie Mellon
8. 2009-2010, Research Assistant Professor, Electrical Engineering and Computer Science, Vanderbilt University
9. 2004-2008, Research Assistant, Distributed Object Computing Group, Vanderbilt University
10. 2006-summer, Researcher, Siemens Corporate Technology SE6, Munich, Germany
11. 2001-2002, IBM Enterprise Application Developer
12. 2002, Art Editor, American Center for Artists, website (www.americanartists.org)
13. 2002, Design and Technology Director, Christopher Isherwood Foundation, Santa Monica, California
14. 2000, Chief Software Architect, Software Teacher Inc.
15. 1997-1999, Art Instructor, Bay Rivers Art Guild

Journal Papers

1. Yu Sun, Jules White, Bo Li, Hamilton Turner, Michael Walker, Automated QoS-Oriented Cloud Resource Optimization using Containers, Springer Automated Software Engineering Journal (to appear)
2. Hyojoon Bae, Jules White, Mani Golparvar-Fard, Yao Pan, Yu Sun, Fast and Scalable 3D Cyber-physical Modeling for High-precision Mobile Augmented Reality Systems, Springer Journal of Personal and Ubiquitous Computing (to appear)
3. Thaddeus Czauski, Jules White, Yu Sun, Sean Eade, Douglas C. Schmidt, NERD - Middleware for IoT Human Machine Interfaces, Annals of Telecommunications (to appear)
4. Yu Sun, Jules White, Sean Eade, Douglas C. Schmidt, ROAR- A QoS-Oriented Modeling Framework for Automated Cloud Resource Allocation and Optimization, Journal of Software and Systems (to appear)
5. Max Roberts, Yu Sun, Thomas Goodwin, Hamilton Turner, Jeff Reed, Jules White. "Software Frameworks for SDR," Proceedings of the IEEE (to appear)
6. Yu Sun, Jules White, Jeff Gray, A Demonstration-based Model Transformation Approach to Automate Model Scalability, Journal of Software and Systems Modeling (to appear)
7. Jose Galindo, David Benavides, Hamilton Turner, Jules White. "Testing Variability Intensive Systems Using Automated Analysis. An application to Android," Springer Journal of Systems and Software (to appear)
8. Hamilton Turner, Jules White, Brandon Amos, Jaime Camelio, Chris Williams, and Robert Parker. "Bad Parts- Are Our Manufacturing Systems At Risk of Silent Cyber-attacks?" IEEE Security & Privacy (to appear)
9. Hyojoon Bae, Mani Golparvar-Fard, Jules White, Image-based Localization and Content Authoring in Structure-from-Motion Point Cloud Models for Real-time Field Reporting Applications, ASCE Journal of Computing in Civil Engineering (to appear)
10. Hamilton Turner, Brian Dougherty, Jules White, Russell Kegley, Jonathan Preston, Douglas C. Schmidt, and Aniruddha Gokhale. "DRE System Performance Optimization with the SMACK Cache Efficiency Metric," Springer Journal of Systems and Software, Volume 98, pp. 25-43, 2014
11. James Edmondson, William Anderson, Jeff Gray, Joe Loyall, Jules White, and Klaus Schmid, Guest Editorial to the Special Section on Next Generation Mobile Computing, IEEE Software, Volume 31, Number 2, pp. 44-47, March/April 2014
12. Jules White, Douglas C. Schmidt, Mani Golparvar-Fard, Guest Editorial to the Special Issue on Applications of Augmented Reality, Proceedings of the IEEE, Volume 2, Number 2, pp. 120--123, 2014
13. Jaime Camelio, Lee J Wells, Christopher B Williams, Jules White, Cyber-Physical Security Challenges in Manufacturing Systems, Manufacturing Letters, Volume 2, Number 2, pp. 74-77, 2014
14. Jules White, David Benavides, Tripti Saxena, Brian Dougherty, Douglas C. Schmidt, Jose A. Galindo,

- Evolving Feature Model Configurations in Software Product Lines, *Journal of Software and Systems*, Volume 87, pp. 119-136, 2014
15. Hyojoon Bae, Mani Golparvar-Fard, Jules White, A High-precision Vision-based Mobile Augmented Reality System for Context-aware AEC/FM Applications, *International Journal of Visualization in Engineering*, Volume 1, Number 1, pp. 1-13, 2013
 16. Yu Sun, Jeff Gray, Romain Delamare, Benoit Baudry, Jules White, Automating the Management of Non-functional System Properties Using Demonstration-based Model Transformation, *Journal of Software Maintenance and Evolution Research and Practice, incorporating Software Process and Practice*, Volume 25, Issue 12, pp. 1335-1356, 2013
 17. Jules White, Brian Dougherty, Richard Schantz, Douglas C. Schmidt, Adam Porter, and Angelo Corsaro, R&D Challenges and Solutions for Highly Complex Distributed Systems - a Middleware Perspective, the *Springer Journal of Internet Services and Applications special issue on the Future of Middleware*, Volume 2, Number 3, pp. 1-8, December 2011
 18. Jianmei Guo, Jules White, Guangxin Wang, Jian Li, Yinglin Wang, A Genetic Algorithm for Optimized Feature Selection with Resource Constraints in Software Product Lines, *Journal of Software and Systems*, Volume 84, Number 12, pp. 2209-2221, 2011
 19. Brian Dougherty, Daniel Guymon, Douglas C. Schmidt, and Jules White, Overcoming Cellular Connectivity Limitations with M2Blue Autonomic Distributed Data Caching, *CSI Communications*, August, 2011. This material is based upon work supported by the National Science Foundation under Grant No. 1047753
 20. Brian Dougherty, Jules White, Douglas C. Schmidt, Model-driven Auto-scaling of Green Cloud Computing Infrastructure, *Future Generation Computer Systems*, Volume 28, Number 2, pp. 371-378, February, 2012
 21. Jules White, Chris Thompson, Hamilton Turner, Brian Dougherty, Douglas C. Schmidt, WreckWatch - Automatic Traffic Accident Detection and Notification with Smartphones, *Springer Journal of Mobile Applications and Networks*, Volume 16, Number 3, pp. 285-303, July 2011
 22. Brian Dougherty, Jules White, Douglas C. Schmidt, Automated Software and Hardware Evolution Analysis for Distributed Real-time and Embedded Systems, *The Central European Journal of Computer Science*, 2011
 23. Jules White, Hamilton Turner, Smartphone Computing in the Classroom, *IEEE Pervasive Computing*, April-June, 2011, Volume 10, Number 2, pp. 82-86, 2011
 24. Brian Dougherty, Jules White, Douglas C. Schmidt, Russell Kegley, Jonathan Preston, Deployment Optimization for Embedded Flight Avionics Systems, *CrossTalk Journal*, Volume 24, Number 6, pp. 1-8, 2011, This research has been funded in part by a grant from the Air Force Research Laboratories.
 25. Jules White, Brian Dougherty, Chris Thompson, Douglas C. Schmidt, ScatterD- Spatial Deployment Optimization with Hybrid Heuristic / Evolutionary Algorithms, *ACM Transactions on Autonomous and Adaptive Systems Special Issue on Spatial Computing*, Volume 6, Number 3, pp. 18:1--18:25, September, 2011, This research has been funded in part by NSF Award
 26. Jules White, Brian Dougherty, Douglas C. Schmidt, ASCENT- An Algorithmic Technique for Designing Hardware and Software in Tandem, *IEEE Transactions on Software Engineering Special Issue on Search-based Software Engineering*, Volume 35, Number 6, pgs. 838-851, November/December, 2010. This research has been funded in part by NSF Award
 27. Jules White, Sibohan Clarke, Brian Dougherty, Chris Thompson, Douglas C. Schmidt, R&D Challenges and Solutions for Mobile Cyber-Physical Applications and Supporting Internet Services, *Springer Journal of Internet Services and Applications*, Volume 1, Number 1, 2010, pp. 45-56. This research has been funded in part by NSF Award
 28. Jules White, David Benavides, Douglas C. Schmidt, Pablo Trinidad, Antonio Ruiz-Cortes, Brian

- Dougherty, Automated Diagnosis of Feature Model Configurations, Journal of Systems and Software, Volume 83, Number 7, pgs. 1094-1107, July, 2010
29. Jules White, James Hill, Jeff Gray, Sumant Tambe, Douglas C. Schmidt, Anirrudha Gokhale, Improving Domain-specific Language Reuse through Software Product-line Configuration Techniques, IEEE Software Special Issue on Domain-Specific Languages and Modeling July/August, 2009, Volume 26, Number 4, pgs. 47-53
 30. Jules White, Brian Dougherty, Douglas C. Schmidt, Selecting Highly Optimal Architectural Feature Sets with Filtered Cartesian Flattening, Journal of Systems and Software, August 2009, Volume 82, Number 8, Pages 1268-1284 (1 of the top 10 most cited papers in JSS from 2009)
 31. Jules White, Jeff Gray, Douglas C. Schmidt, Constraint-based Model Weaving, Springer Transactions on Aspect-Oriented Software Development Special Issue on Aspects and Model-Driven Engineering, 2009, Volume 5560, Number 6, Pages 153-190
 32. Jules White, Douglas C. Schmidt, Automating Deployment Planning with an Aspect Weaver, IET Software Special Issue on Domain-specific Modeling Languages for Aspect-Oriented Programming, Volume 3, Issue 3, p. 167-183, June 2009
 33. Jules White, Harrison Strowd, Douglas C. Schmidt, Creating Self-healing Service Compositions with Feature Models and Microbooting, International Journal of Business Process Integration and Management, Special issue on Model-Driven Service-Oriented Architectures, Inderscience Publishers, pages 35-46, Volume 4, Number 1, 2009
 34. Jules White, Douglas C. Schmidt, Andrey Nechypurenko, Egon Wuchner, Model Intelligence- an Approach to Modeling Guidance, UPGRADE Journal, Volume 9, Number 2, pgs. 22-28, April 2008 / (Spanish Translation of Model Intelligence) Jules White, Douglas C. Schmidt, Andrey Nechypurenko, Egon Wuchner, Inteligencia de modelos- un enfoque para guiar el modelado, Novatica, Number 192, pgs. 21-27, April 2008, (one of five Finalists for the Novatica "Best Paper of the Year" Award), 2008
 35. Jules White, Douglas C. Schmidt, Egon Wuchner, Andrey Nechypurenko, Automatically Composing Reusable Software Components for Mobile Devices, Journal of the Brazilian Computer Society Special Issue on Software Reuse, SciELO Brasil, Volume 14, Number 1, pgs. 25-44, March, 2008
 36. Jules White, Douglas Schmidt, Aniruddha Gokhale, Simplifying Autonomic Enterprise Java Bean Applications via Model-driven Engineering and Simulation, Journal of Software and Systems Modeling, Springer, Volume 7, Number 1, pgs. 3-23, May, 2007 (9th most cited and 11th most downloaded Software and Systems Modeling paper as of Oct. 2009)

Conference Publications

1. Peng Zhang, Jules White, Douglas C. Schmidt, HoliCoW - Automatically Breaking Team-based Software Projects to Motivate Student Testing, International Conference on Software Engineering Software Engineering in Education Track, Austin, TX, May 14-22, 2016
2. Sam Hurd, Carmen Camp, Jules White, Quality Assurance in Additive Manufacturing Through Mobile Computing, The 7th EAI International Conference on Mobile Computing, Applications and Services, Nov 12-13, 2015, Berlin, Germany
3. Yao Pan, Jules White, Yu Sun, Jeff Gray, Gray Computing- An Analysis of Computing with Background JavaScript Tasks, International Conference on Software Engineering, May 16-21, 2015, Florence, Italy (18.5% acceptance rate)
4. Yu Sun, Hyojoon Bae, Sukanya Manna, Jules White and Mani Golparvar-Fard, Bridging Semantics with Physical Objects using Augmented Reality, IEEE International Conference on Semantic Computing, February 7-9, 2015, Anaheim, CA
5. Logan Sturm, Chris Williams, Jaime Camelio, Jules White, Robert Parker, Cyber-physical Vulnerabilities in Additive Manufacturing Systems, 25th Annual Solid Freeform Fabrication Symposium, August 4-6,

2014, Austin, TX

6. Yu Sun, Jules White, Sean Eade, A Model-Based System to Automate Cloud Resource Allocation and Optimization, Models 2014, Sept 28-Oct 3, Valencia, Spain (23% acceptance rate)
7. Hyojoon-Bae, Mani Golparvar-Fard, Jules White, Rapid Image-based Localization using Clustered 3D Point Cloud Models with Geo-Location Data for AEC/FM Mobile Augmented Reality Applications, ASCE International Conference on Computing in Civil and Building Engineering, June 23-24, 2014, Orlando, FL
8. Jules White, Chris Gill, Douglas C. Schmidt, Elastic Software Infrastructure to Support Computing Clouds for Cyber-Physical Systems, IEEE Symposium On Object/Component/Service-Oriented Real-Time Distributed Computing, June 10-14, 2014, Reno, Nevada
9. Jules White, Yao Pan, Zack McCormic, Addressing the Challenges of HTTP-based Mobile/Cloud Interaction, IEEE International Conference on Mobile Cloud Computing, Services, and Engineering, Oxford, UK, April 8-11, 2014
10. T. Czauski, H. Turner, J. White, and S. Eade, NERD - No Effort Rapid Development - A Framework for Deploying Mobile Cloud Industrial Control Applications in Mobile Cloud Computing, Services, and Engineering (MobileCloud), 2014 IEEE 2nd International Conference on, to be published.
11. Hyo-joon Bae, Mani Golparvar-Fard, Jules White, Image-based Localization for Facility Management Mobile Augmented Reality Applications, Construction Research Congress, Atlanta, GA, May 19-21, 2014
12. Hamilton Turner and Jules White. Multi-core Deployment Optimization Using Simulated Annealing and Ant Colony Optimization. In Proc. of the 11th IEEE International Symposium on Parallel and Distributed Processing with Applications, Melbourne, Australia, July 16-18 2013 (** Received the Best Student Paper Award ** 35% acceptance rate).
13. Hamilton Turner, L. Justin Stiltner, Sumedha Mohan, Kevin Kochersberger, and Jules White, An Experimentation Framework for Smartphone-based UAV Tracking and Control, AIAA Infotech@Aerospace 2013 Conference- Unmanned Systems Applications, August 19-22, 2013, Boston, MA
14. Hyo-Joon Bae, Mani Golparvar-Fard, Jules White, Modeling, Analyzing, and Visualizing 4D Spatio-Temporal Construction Site Information using Vision-based Mobile Augmented Reality Systems, CONVR 2013, 13th International Conference on Construction Applications of Virtual Reality, 30-31 Oct 2013, London
15. Hyo-Joon Bae, Mani Golparvar-Fard, Jules White, High-precision and Infrastructure-independent Mobile Augmented Reality System for Context-Aware Construction and Facility Management Applications, ASCE International Workshop on Computing in Civil Engineering, June 23-25, 2013, Los Angeles, CA (**Received the Best Paper Award**) (although titled a workshop, this is a multi-track event that would be considered a conference in CS and is the premier conference for computing and Civil Engineering)
16. Brandon Amos, Hamilton Turner, and Jules White. Applying Machine Learning Classifiers to Dynamic Android Malware Detection at Scale. In IWCMC'13 Security, Trust and Privacy Symposium (IWCMC2013-Security), Cagliari, Italy, July 2013 (35% acceptance rate).
17. T. Czauski, P. Miranda, and J. White. "Utilizing Cyber-Physical Systems to Rapidly Access and Guard Patient Records," in Indoor Positioning and Indoor Navigation (IPIN), 2013 International Conference on, 2013, pp.318–319.
18. Alan Baines, Thaddeus Czauski, Mani Golparvar-Fard, Jules White, and Brian Dougherty, "CTrack- A Cyber-Physical Approach to Construction Site Work Improvement Studies," The 9th International Wireless Communications & Mobile Computing Conference, July 1-5, 2013, Cagliari, Sardinia, Italy (35% acceptance rate).
19. Hamilton Turner, Thaddeus Czauski, Danny Guymon, Brian Dougherty, Jules White, Dynamic Tessellation of Geographical Regions to Ensure K-Anonymity, IEEE/IFIP International Conference on Embedded and Ubiquitous Computing, Paphos, Cyprus, December 5-7, 2012 (35% acceptance rate).

20. Hyo-Joon Bae, Mani Golparvar-Fard, Jules White, Enhanced HD4AR (Hybrid 4-Dimensional Augmented Reality) for Ubiquitous Context-Aware AEC/FM Applications, International Conference on Construction Applications of Virtual Reality, Taipei, Taiwan, November 1-2, 2012 (***) Received the Best Paper Award (***)
21. Daniel Guymon, Alan Baines, Jordan Scherigert, Jules White, Accelerometer-based Gesture End-user Authentication for P2P Communication on Smartphones, 4th International Conference on Future Computer and Communication, Hong Kong, August 3-5, 2012 (28% acceptance rate). This material is based upon work supported by the National Science Foundation under Grant No. 1047753 (***) Received the Best Presentation Award (***)
22. Bjorn Andersson, Sagar Chaki, Dionisio de Niz, Brian Dougherty, Russell Kegley, Jules White, Non-Preemptive Scheduling with History-Dependent Execution Time, Euromicro Conference on Real-time Systems, Pisa, Italy, July 10-13, 2012
23. Hamilton Turner, Jules White, Cyber security and data collection approaches for smartphone sensor systems. In Proceedings of Ground/Air Multisensor Interoperability, Integration, and Networking for Persistent ISR III, Baltimore, MD, April 23-27, 2012. This material is based upon work supported by the National Science Foundation under Grant No. 1047753.
24. Paul Miranda, Nikita Sharakhov, Jules White, Mani Golparvar-Fard, Brian Dougherty, Hybrid 4-Dimensional Augmented Reality, International Conference on Pervasive and Embedded Computing and Communications, Rome, Italy, February 24-46, 2012
25. Zach Rattner, Hamilton Turner, Daniel Guymon, Brian Dougherty, Jules White, An Energy Synchronization Method for Distributed File Synchronization Algorithms on Mobile Devices, International Conference on Pervasive and Embedded Computing and Communications, Rome, Italy, February 24-46, 2012. This material is based upon work supported by the National Science Foundation under Grant No. 1047753.
26. Mani Golparvar-Fard, Paul Miranda, Nikita Sharakhov, Jules White, Hybrid 4-Dimensional Augmented Reality Models for Ubiquitous Context-Aware Construction Management Applications, Construction Research Congress, West Lafayette, IN, May 21-23, 2012
27. Brian Dougherty, Jules White, Russell Kegley, Jonathan Preston, Douglas C. Schmidt, and Aniruddha Gokhale, Optimizing DRE System Performance with the SMACK Cache Efficiency Metric, 1st International Symposium on Secure Virtual Infrastructures (DOA-SVI'11), October 17-19, 2011, Crete, Greece.
28. Danny Guymon, Jules White, Brian Dougherty, Mani Golparvar-Fard, Power-efficient Cyber-physical Late Arrival Detection with Smartphones, IEEE International Conference on Cyber, Physical, and Social Computing, October 19-22, 2011, Dalian, China
29. Hamilton Turner and Jules White, Verification and Validation of Smartphone Sensor Networks, the International ICST Conference on MOBILE Wireless MiddleWARE, Operating Systems, and Applications, June 22-24, 2011, London, UK. This material is based upon work supported by the National Science Foundation under Grant No. 1047753.
30. Yu Sun, Jeff Gray, Christoph Wienands, Michael Golm, Jules White, A Demonstration-based Approach to Support Live Transformations in a Model Editor, International Conference on Model Transformation, Zurich, Switzerland, June 27-28, 2011 (21% Acceptance Rate)
31. Chris Thompson, Hamilton Turner, Jules White, Douglas C. Schmidt, Analyzing Mobile Application Software Power Consumption via Model-driven Engineering, 1st International Conference on Pervasive and Embedded Computing and Communication Systems, Algarve, Portugal, March 5-7, 2011 (14% Acceptance Rate), (***)Received the Best Student Paper Award(***)
32. Anushi Shah, Jules White, Aniruddha Gokhale, Maximizing Service Uptime of Smartphone-based Distributed Real-time and Embedded Systems, IEEE International Symposium on Object/Component/Service-oriented Real-time Distributed Computing, March 28-31, 2011, Newport

Beach, CA

33. Chris Thompson, Jules White, Brian Dougherty, Adam Albright, and Douglas C. Schmidt, Using Smartphones and Wireless Mobile Networks to Detect Car Accidents and Provide Situational Awareness to Emergency Responders, Third International ICST Conference on MOBILE Wireless MiddleWARE, Operating Systems, and Applications (Mobilware 2010), June 30-July 2, 2010, Chicago, IL (one of four papers selected for publication in a special journal issue).
34. Matthias Farwick, Berthold Agreiter, Jules White, Simon Forster, Norbert Lanza and Ruth Breyer, A Web-Based Collaborative Metamodeling Environment with Secure Remote Model Access, Proceedings of the 10th International Conference on Web Engineering, July 5-9, 2010, Vienna, Austria
35. J. Benjamin Gotow, Krzysztof Zienkiewicz, Jules White, and Douglas C. Schmidt, Addressing Challenges in Delivering Augmented Reality Applications to Smartphones, Third International ICST Conference on MOBILE Wireless MiddleWARE, Operating Systems, and Applications (Mobilware 2010), June 30-July 2, 2010, Chicago, IL.
36. Yu Sun, Jules White, Jeff Gray, Model Transformation by Demonstration, Proceedings of MODELS 2009, ACM/IEEE 8th International Conference on Model Driven Engineering Languages and Systems, October 4-9, 2009, Denver, Colorado (16% Acceptance Rate)
37. Jules White, David Benavides, Brian Dougherty, Douglas C. Schmidt, Automated Reasoning for Multi-step Software Product-line Configuration Problems, Software Product-lines Conference (SPLC), 10pgs. August 24-28, 2009, San Francisco, CA (30% Acceptance Rate)
38. Brian Dougherty, Jules White, Jaiganesh Balasubramanian, Chris Thompson, and Douglas C. Schmidt, Deployment Automation with BLITZ, 31st International Conference on Software Engineering, May 16-24, 2009 Vancouver, Canada.
39. Jules White, Douglas C. Schmidt, David Benavides, Pablo Trinidad, Antonio Ruiz-Cortez, Automated Diagnosis of Product-line Configuration Errors in Feature Models, Software Product Lines Conference (SPLC), 10pgs., September, 2008, Limerick, Ireland (30% Acceptance Rate), ***Received the Best Paper Award***
40. Brian Dougherty, Jules White, Chris Thompson, and Douglas C. Schmidt, Automating Hardware and Software Evolution Analysis, 16th Annual IEEE International Conference and Workshop on the Engineering of Computer Based Systems (ECBS), April 13-16, 2009 San Francisco, CA USA.
41. Jules White and Douglas C. Schmidt, Model-Driven Product-Line Architectures for Mobile Devices, Proceedings of the 17th Annual Conference of the International Federation of Automatic Control, 6pgs., July 6-11, 2008, Seoul, Korea
42. Jules White and Douglas C. Schmidt, Automated Configuration of Component-based Distributed Real-time and Embedded Systems from Feature Models, Proceedings of the 17th Annual Conference of the International Federation of Automatic Control, 6pgs., July 6-11, 2008, Seoul, Korea
43. Jules White, Krzysztof Czarnecki, Douglas C. Schmidt, Gunther Lenz, Christoph Wienands, Egon Wuchner, and Ludger Fiege, Automated Model-based Configuration of Enterprise Java Applications, Enterprise Computing Conference (EDOC), 12pgs., October, 2007, Annapolis, Maryland (28% Acceptance Rate)
44. Jules White, Douglas C. Schmidt, Egon Wuchner, Andrey Nechypurenko, Optimizing and Automating Product-Line Variant Selection for Mobile Devices, 11th Annual Software Product Line Conference (SPLC), 10pgs., September 10-14, 2007, Kyoto, Japan (35% Acceptance Rate)
45. Andrey Nechypurenko, Egon Wuchner, Jules White, and Douglas C. Schmidt, Application of Aspect-based Modeling and Weaving for Complexity Reduction in the Development of Automotive Distributed Realtime Embedded Systems, Proceedings of the Sixth International Conference on Aspect-Oriented Software Development, 10pgs., Vancouver, British Columbia, March 12-16, 2007 (18% Acceptance Rate)
46. Jules White and Douglas C. Schmidt, Reducing Enterprise Product Line Architecture Deployment Costs

- via Model-Driven Deployment and Configuration Testing, Poster paper at the 13th Annual IEEE International Conference and Workshop on the Engineering of Computer Based Systems (ECBS '06), 2pgs., March 27th-30th, 2006, University of Potsdam, Potsdam, Germany.
47. Jules White, Douglas Schmidt, and Aniruddha Gokhale, Simplifying Autonomic Enterprise Java Bean Applications via Model-driven Development- a Case Study, Proceedings of MODELS 2005, ACM/IEEE 8th International Conference on Model Driven Engineering Languages and Systems, 11pgs., Half Moon Resort, Montego Bay, Jamaica, October 5-7, 2005. (Selected as a best paper) (27% Acceptance Rate)
 48. Jules White, Douglas Schmidt, and Aniruddha Gokhale, The J3 Process for Building Autonomic Enterprise Java Bean Systems, Proceedings of the International Conference on Autonomic Computing (ICAC 2005), 2pgs., Seattle, WA, June 2005 (short paper) (17% Acceptance Rate).
 49. Jules White, Boris Kolpackov, Balachandran Natarajan, and Douglas C. Schmidt, Reducing Code Complexity With Vocabulary-Specific XML Language Bindings, Proceedings of the 43rd ACM Southeastern Conference, 7pgs., Atlanta, GA, March 2005.

Book Chapters

1. Mike Walker, Douglas C. Schmidt, Jules White, An Elastic Platform for Large-scale Assessment of Software Assignments for MOOCs in User-Centered Design Strategies for Massive Open Online Courses, Ricardo Mendoza-Gonzalez, IGI Global, Hershey, PA, USA, 2016
2. Chris Thompson, Jules White, and Douglas C. Schmidt, Analyzing Mobile Software Power Consumption via Model-driven Engineering, Progressions and Innovations in Model-Driven Software Engineering edited by Vicente García Díaz, Juan Manuel Cueva Lovelle, Begoña Cristina Pelayo García-Bustelo and Oscar Sanjuan Martinez, IGI Global, Hershey, PA, USA (to appear)
3. Hamilton Turner, Jules White, Jeff Reed, Adam Porter, Madhav Marathe, Anil Vullikanti, Aniruddha Gokhale. Building a Cloud-based Mobile Application Testbed. In Software Testing in the Cloud- Perspectives on an Emerging Discipline edited by Scott Tilley. IGI Global 2012 (to appear)
4. Yu Sun, Jeff Gray, Gerti Kappel, Philip Langer, Manuel Wimmer, and Jules White, A WYSIWYG Approach to Support Layout Configuration in Model Evolution, Emerging Technologies for the Evolution and Maintenance of Software Models, edited by Jorg Rech and Christian Bunse, IGI Global, Hershey, PA, USA (to appear)
5. Jules White, Brian Dougherty, Harrison Strowd, and Douglas C. Schmidt, Using Filtered Cartesian Flattening and Microbooting to Build Enterprise Applications with Self-adaptive Healing, Software Engineering for Self-Adaptive Systems, edited by Betty H. C. Cheng, Rogerio de Lemos, Holger Giese, Paola Inverardi, and Jeff Magee, Springer, Berlin, Germany, Pages 241-260, 2009 (to appear)
6. Jules White, Douglas C. Schmidt, Andrey Nechypurenko, and Egon Wuchner, Reducing the Complexity of Modeling Large Software Systems, Software Applications- Concepts, Methodologies, Tools, and Applications, edited by Pierre F. Tiako, IGI Global, Hershey, PA, USA, 2009 (originally published in Designing Software-Intensive Systems- Methods and Principles)
7. Jules White, Andrey Nechypurenko, Egon Wuchner, and Douglas Schmidt, Reducing the Complexity of Designing and Optimizing Large-scale Systems by Integrating Constraint Solvers with Graphical Modeling Tools, Designing Software-Intensive Systems- Methods and Principles, edited by Pierre F. Tiako, IGI Global, Hershey, PA, USA, 2008
8. Hamilton Turner, Jules White, Chris Thompson, Krzysztof Zienkiewicz, Scott Campbell, Douglas C. Schmidt, Building Mobile Sensor Networks Using Smartphones and Web Services- Ramifications and Development Challenges, Handbook of Research on Mobility and Computing- Evolving Technologies and Ubiquitous Impacts, edited by Maria Manuela Cruz-Cunha and Fernando Moreira, IGI Global, Hershey, PA, USA 2009 (to appear)
9. Brian Dougherty, Jules White, Douglas C. Schmidt, MDA-based Configuration of Distributed Real-time

and Embedded Systems, Model-driven Analysis and Software Development- Architectures and Functions, edited by Janis Osis and Erika Asnina, IGI Global, Hershey, PA, USA 2011. This research has been funded in part by NSF Award

10. Yu Sun, Jules White, Jeff Gray, Aniruddha Gokhale, Douglas C. Schmidt, Model-Driven Automated Error Recovery in Cloud Computing, Model-driven Analysis and Software Development- Architectures and Functions, edited by Janis Osis and Erika Asnina, IGI Global, Hershey, PA, USA 2011.
11. Jules White, Brian Dougherty, Model-driven Testing and Analysis of Product-line Architectures, Model-driven Analysis and Software Development- Architectures and Functions, edited by Janis Osis and Erika Asnina, IGI Global, Hershey, PA, USA 2011.

Workshop Publications

1. Violetta Vylegzhanina, Douglas C. Schmidt and Jules White, Gaps and Future Directions in Mobile Security Research, 3rd International Workshop on Mobile Development Lifecycles, October 26, 2015, Pittsburgh, PA
2. Hamilton Turner, Jules White, Jeff Gray, Engineering Challenges of Deploying Crowd-based Data Collection Tasks to End-User Controlled Smartphones, International Workshop on Emerging Mobile Sensing Technologies, Systems, and Applications, June 12, 2011, San Francisco, CA
3. Yu Sun, Hyun Cho, Jeff Gray, Jules White, Key Challenges for Modeling Language Creation by Demonstration, FlexiTools workshop at the International Conference on Software Engineering, May 22, 2011, Honolulu, Hawaii
4. Yu Sun, Hyun Cho, Jeff Gray, Jules White, Supporting Feature Model Configuration using a Demonstration-based Approach, 2nd International Workshop on Product Line Approaches in Software Engineering, May 22-23, Honolulu, Hawaii
5. Yu Sun, Jeff Gray, Philip Langer, Manuel Wimmer, Jules White, A WYSIWYG Approach for Configuring Model Layout using Model Transformations, DSM 2010, Reno, Nevada, October 17-18, 2010
6. Yu Sun, Jeff Gray, Jules White, MT-Scribe- A Flexible Tool to Support Model Evolution, FlexiTools Workshop at SPLASH (formerly OOPSLA) 2010, October 17, Reno, Nevada
7. Hyun Cho, Jeff Gray, Jules White, Ontology Support for Abstraction Layer Modularization, ACoM 2010, JeJu Island, South Korea, September 14, 2010
8. Jules White, Douglas C. Schmidt, R&D Challenges and Emerging Solutions for Multicore Deployment/Configuration Optimization, Future of Software Engineering Research Workshop at the International Symposium on the Foundations of Software Engineering, Santa Fe, New Mexico, November 7-11, 2010
9. Chris Thompson, Jules White, Brian Dougherty, and Douglas C. Schmidt, Optimizing Mobile Application Performance with Model-Driven Engineering, Proceedings of the 7th IFIP Workshop on Software Technologies for Future Embedded and Ubiquitous Systems (SEUS 2009), November 16-18, 2009, Newport Beach, California. This research has been funded in part by NSF Award
10. Jules White, Douglas C. Schmidt, Filtered Cartesian Flattening- An Approximation Technique for Optimally Selecting Features while Adhering to Resource Constraints, First International Workshop on Analyses of Software Product Lines at the 12th International Software Product Line Conference, Limerick, Ireland, September 12, 2008
11. James Hill, Jules White, Sean Eade, and Douglas C. Schmidt, Towards a Solution for Synchronizing Disparate Models of Ultra-Large-Scale Systems, Proceedings of the 2nd International Workshop on Ultra-Large-Scale Software-Intensive Systems at the 30th IEEE/ACM International Conference on Software Engineering, May 10-11, 2008, Leipzig, Germany.
12. Jules White, Douglas C. Schmidt, Sean Mulligan, The Generic Eclipse Modeling System, Model-Driven Development Tool Implementer's Forum at the 45th International Conference on Objects, Models,

Components and Patterns, June, 2007, Zurich Switzerland

13. Andrey Nechypurenko, Jules White, Egon Wuchner, and Douglas C. Schmidt, Applying Model Intelligence Frameworks for Deployment Problem in Real-time and Embedded Systems, Proceedings of the MARTES Workshop- Modeling and Analysis of Real-Time and Embedded Systems at the 9th International Conference on Model Driven Engineering Languages and Systems, Genoa, Italy, October 2006.
14. Jules White, Andrey Nechypurenko, Egon Wuchner, and Douglas C. Schmidt, Intelligence Frameworks for Assisting Modelers in Combinatorically Challenging Domains, Proceedings of the Workshop on Generative Programming and Component Engineering for QoS Provisioning in Distributed Systems, October 23, 2006, Portland, Oregon.
15. Jules White and Douglas Schmidt, Simplifying the Development of Product-line Customization Tools via Model Driven Development, Workshop on MDD for Software Product-lines- Fact or Fiction? at the 8th International Conference on Model Driven Engineering Languages and Systems, October 2, 2005, Jamaica.

Magazine Articles

1. Jules White, Douglas C. Schmidt, Andrey Nechypurenko, and Egon Wuchner, Introduction to the Generic Eclipse Modeling System, Eclipse Magazine, Volume 06, January, 2007.
2. Egon Wuchner, Andrey Nechypurenko, Jules White, Douglas C. Schmidt, Das "Generic Eclipse Modeling System" (GEMS)- skalierbare Domänenmodellierung leicht(er) gemacht, ObjectSpektrum, June, 2007

Submitted Publications

1. Yao Pan, Jules White, Yu Sun, Jeff Gray, Supporting Computational Bioinformatics with Gray Computing, IEEE/ACM Transactions on Computational Biology Special Issue on Advanced Parallel Computing Systems
2. Yu Sun, Jules White, Michael Walker, Hamilton Turner, Automated Container based Cloud Resource Optimization, IEEE/ACM International Conference on Automated Software Engineering, Sept. 15-19, 2014, Vasteras, Sweden
3. José A. Galindo, Hamilton Turner, David Benavides and Jules White, Testing variability intensive systems using automated analysis. An application in Android, Software Quality Journal.

Poster Publications

1. J. White, D. Schmidt, "Simplifying the Development of Product-Line Customization Tools via the Generic Eclipse Modeling System," OOPSLA 2005, eclipse Technology eXchange (eTX), Oct 16-20, San Diego, California
2. T. Czauski, P. Miranda, and J. White. "Utilizing cyber-physical systems to rapidly access and guard patient records," presented at the 8th Via Research Recognition Day, Blacksburg, VA, 2013. (Honorable mention- 4th place clinical research student poster competition)
3. Thaddeus Czauski, Paul Miranda, Jules White, Utilizing Cyber-physical Systems to Rapidly Access and Guard Patient Records, International Conference on Indoor Positioning and Indoor Navigation, Montpellier, France, October 28-31, 2013

Demos

1. Yu Sun, Jeff Gray, Jules White, MT-Scribe- A Tool for Recording and Inferring Model Transformations, Tool Demo, OOPSLA 2010

2. Yu Sun, Jeff Gray, and Jules White, "MT-Scribe- An End-User Approach to Automate Software Model Evolution," Tool Demonstration, International Conference on Software Engineering (ICSE), Honolulu, HI, May 2011.

Grants and Contracts

1. Automatically Devising Privacy Controls for Online Social Networks Using Contextual Information, L3, \$30,000, 4/1/13 to 3/31/14, J. White, PI
2. Machine Learning and Metaheuristic Optimization of Cloud Computing, L3, \$30,000, 4/1/13 to 3/31/14, J. White, PI
3. Hawksnest, NSA, \$204,975, 1/1/13 to 7/1/13, J. Reed, PI, J. White, co-PI, C. Dietrich, co-PI
4. Cyber-physical Systems Security, VT, \$20,289, 1/1/13 to 12/31/14, J. White, PI
5. CSR- Workshop- Computing Clouds for Cyber Physical Systems (CC-4-CPS), NSF, \$73,738, 3/13/13 to 3/14/13, D.C. Schmidt, PI, J. White, co-PI, C. Gill, co-PI
6. Hybrid 4-Dimensional Augmented Reality-Environments for Ubiquitous Markerless Context-Awareness Architecture/Engineering/Construction Professionals, NSF, \$299,967, 8/10/12 to 7/31/15, M. Golparvar-Fard, PI, J. White co-PI
7. Android / Arduino Attack Surface Analysis, ARO, \$64,884, 8/15/12 to 8/14/13, J. White, PI, J. Reed, co-PI
8. C2ORES, AFRL, \$300,000, 8/15/12 to 8/14/13, D.C. Schmidt, PI, J. White, co-PI, J. Hill co-PI, A. Gokhale, co-PI
9. Dynamically Managed Mobile Security, VT-ARC, 8/10/11 to 12/31/11, \$100,000, J. White, PI
10. Cross-platform Data-Intensive Smartphone Applications, Siemens, 10/1/11 to 9/30/2012, \$99,937, J. White, PI
11. Enhanced Reality for Military Applications, Institute for Critical Technologies and Applied Science, 9/1/2011 to 8/31/2012, \$40,000, J. Reed, PI, J. White, co-PI
12. The Android Tactical Application Analysis and Knowledge Cloud, ARO, 6/15/2011 to 6/14/2012, \$250,000, J. White, PI, J. Reed, co-PI, S. Hasan, co-PI, A. Porter, co-PI, A. Gokhale, co-PI, T. Bapty, co-PI
13. RAPID- Collaborative Research- Cloud Environmental Analysis and Relief, NSF, 8/14/10 to 8/14/12, \$65,201, J. White, PI
14. Predictive Cache Modeling and Analysis, AFRL, (subcontract through Lockheed Martin Aeronautics), 4/8/10 to 10/8/2011, \$230,000, J. White, PI, D.C. Schmidt, co-PI
15. Automated Deployment and Configuration of Distributed Real-time and Embedded System Software Using Heuristic Search Techniques, NSF, 9/1/09 to 9/1/12, \$472,000, A. Gokhale, PI, J. White, co-PI
16. Vanderbilt IDEAS, \$200,000, Yi Cui, Aniruddha Gokhale, Kenneth Pence, Douglas Schmidt and Jules White
17. Early Integration and Performance Testing of Heterogeneous Computing Environments, Australian DoD, 1/1/09 to 7/1/09, \$180,000, D.C. Schmidt, PI, J. White, co-PI, J. Hill, co-PI, and A. Gokhale, co-PI
18. Visual Software- Reducing the Complexity of Student Software Development through Model-Driven Development, Teaching as Research (TAR) Award, Vanderbilt Center for Teaching, 9/1/08 to 12/28/08, \$3,000, Fall, 2008, J. White, PI

Press

1. The following is a list of the press coverage that the research and teaching projects I have worked on have received-
2. Droid Report, Augmented Reality Interview, <http://www.droidreport.com/jules-white-assistant-professor-computer-science-vanderbilt-university-interview-7640>

3. Forbes, Roundup of Free Cloud Computing Online Courses,
<http://www.forbes.com/sites/louiscolombus/2014/01/30/roundup-of-free-cloud-computing-online-courses/>
4. eCampus News, 7 Free Online Cloud Computing Courses,
<http://www.ecampusnews.com/technologies/cloud-computing-online-311/>
5. MIT Technology Review, The Most Controlling Smartphone Ever Made,
<http://www.technologyreview.com/news/508056/the-most-controlling-smartphone-ever-made/>
6. ARS Technica, Researchers Lock Down Android to Keep Data from Walking Out of the Door,
<http://arstechnica.com/business/2011/10/researchers-lock-down-android-to-keep-data-from-walking-out-the-door/>
7. Time, Researchers Fine-tune Android to Lock Apps Based on Location,
<http://techland.time.com/2011/10/25/researchers-fine-tune-android-to-lock-apps-based-on-location/>
8. Wall Street Journal, Researchers at Virginia Tech have developed software for the Android OS that enforce policies on mobile devices based on what room they're in,
http://blogs.wsj.com/digits/2011/10/18/tech-today-apple-yahoo-report-earnings-today/?mod=google_news_blog
9. PC Magazine, VT Technology Locks Apps/Smartphones to a Physical Location,
http://www.pcmag.com/article2/0,2817,2394719,00.asp#fbid=_HtZdgnRfIV
10. Huffington Post, Jules White's Debut L.A. Exhibition at the Gregory Way Gallery
11. Huffington Post, 21 of the Coolest Book Covers of the Year
12. CBS Smart Planet, Armed with smartphones, 'citizen scientists' to collect disaster data
13. Discovery Channel Planet Green, Smartphones and citizen scientists can help streamline disaster relief
14. Christian Science Monitor, Venture capital firms think small to help startups
15. Motorola MOTODEV Podcast
16. The Tennessean: Venture Capital Firms Think Small to Help Startups
17. Tech News World: Is Dell Getting Its Android On?
18. The Vanderbilt Hustler: Vanderbilt Students Help Launch Hands-on iPhone Course
19. Inside Higher ED: Where Phones in Class Are OK
20. On GWT: Gwigo - Social Mapping Powered by GWT and AppEngine
21. The Vanderbilt View: Application Inspiration
22. Venture Nashville Connections: 'Smart tech ventures spawned by VU students and entrepreneurs

Courses Taught

1. ECE 6504 Foundations of Mobile Cyber-physical Applications, Virginia Tech, Spring, 2011 (overall instructor rating of 4 out of 4, 4 is "Excellent")
2. ECE 4564 Network Application Design, Virginia Tech, Fall, 2010 (overall instructor rating of 3.7 out of 4, 4 is "Excellent")
3. CS 279 Software Engineering Projects, Vanderbilt University, Spring, 2009 (overall instructor rating of 4.8 out of 5)
4. CS 278 Principles of Software Engineering, Vanderbilt University, Fall, 2008 (overall instructor rating of 4.66 out of 5, 5 is "Excellent")
5. EECE 261 Voice and Data Communications, Vanderbilt University, Fall, 2009 (overall instructor rating of 4.4 out of 5)
6. EECE 262 Local Area Networks and Smartphone Networking Projects, Vanderbilt University, Spring, 2010 (overall instructor rating of 4.5 out of 5)

Professional Activities

1. Chief Editor, Proceedings of the IEEE Special Issue on Applications of Augmented Reality Environments
2. Co-organizer, CSR- Workshop- Computing Clouds for Cyber Physical Systems (CC-4-CPS)
3. Guest Editor, IEEE SW 2013 - IEEE Software Special Issue on Next Generation Mobile Computing
4. Program committee, Modelsward 2015
5. Program committee, PECCS 2015
6. Program committee, Artificial Intelligence and Software Engineering (AISE) track again at BICT 2014
7. Program committee, IEEE/IFIP Conference on Embedded and Ubiquitous Computing, Paphos, Cyprus, October 3-5, 2012
8. Program committee, International Conference on Software Product Lines, Salvador, Brazil, September 2-12, 2012
9. Program committee, International Conference on Pervasive and Embedded Computing and Communication Systems, Rome, Italy, February 24-26, 2011
10. Program co-Chair, International Symposium on Secure Virtual Infrastructures, Crete, Greece, October 17-19, 2011
11. Program Vice-Chair, IEEE/ACM International Conference on Cyber, Physical, and Social Computing, Dalian, China, October 19-22, 2011
12. Co-organizer, Smartphones in the Curriculum Workshop at the 24th IEEE Conference on Software Engineering Education and Training, Waikiki, Honolulu, Hawaii, May 22, 2011
13. Judge, ACM Student Research Competition, SPLASH 2011, Portland, OR, October 24-27, 2011
14. Program committee, The 9th IEEE/IFIP International Conference on Embedded and Ubiquitous Computing, Melbourne, Australia
15. Program committee, Model-Driven Engineering, Logic and Optimization Workshop, June 6, 2011, University of Birmingham, Birmingham, UK
16. Program committee, 49th International Conference on Objects, Models, Components and Patterns, Zurich, Switzerland, June 28-30, 2011
17. Program committee, International Conference on Pervasive and Embedded Computing and Communication Systems 2011, Algarve, Portugal
18. Program committee, IEEE/ACM International Conference on Green Computing and Communications (GreenCom) 2010, Hangzhou, China
19. Co-organizer, The Object-Oriented Trivia Show at SPLASH (formerly OOPSLA) 2010, Reno, Nevada
20. Program committee, IEEE International Conference on High Performance Computing and Communications (HPCC 2010), Melbourne, Australia
21. Program committee, IEEE International Workshop on Mobile Cyber-Physical Systems 2010, Xi'an, China
22. Program committee, Artificial Intelligence and Software Engineering Track, 5th International ICST Conference on Bio-Inspired Models of Network, Information, and Computing Systems (BIONETICS 2010)
23. Student research competition committee for the Systems, Programming, Languages, Architectures, and Software for Humanity (SPLASH formerly known as OOPSLA), October, 2010, Reno, Nevada.
24. Doctoral symposium panel, OOPSLA 2009, Orlando, FL, October 27, 2009
25. Program committee, European Conference on Modeling Foundations and Applications, Paris, France, June 15-18, 2010
26. Program committee, VaMos 2010, Pohang, South Korea, January 27-29, 2010
27. Local arrangements chair for the 2009 Distributed Event-based Systems Conference (DEBS), Nashville, TN, July 6-9
28. Reviewer, Models 2009, Denver, CO, October 4-9, 2009
29. Publicity chair for the MoDELS 2007 conference, Nashville, TN, Oct. 1-5, 2007
30. Co-organizer of the Model-Driven Development Tool Implementor's Forum Workshop, TOOLS 2007, Zurich, Switzerland, June, 2007

31. Program committee member of the 2009 European Conference on Model Driven Architecture - Foundations and Applications (ECMDA-FA), Enschede, The Netherlands
32. Program committee member of the Models@Runtime workshop, Models 2007, Nashville, TN
33. Panel moderator at the MoDELS 2008 conference, Toulouse, France, Sept. 28-Oct. 3, 2008
34. Panels moderator for the MoDELS 2006 conference, Genoa, Italy, Oct. 2-5, 2006

Tutorials

1. Model-driven Engineering, ACM Southeast Conference 2010, Oxford, MS
2. Product-line Modeling and Automation with Eclipse, OOPSLA 2008, Nashville, TN, USA, Oct. 20, 2008
3. Product-line Modeling and Automation with Eclipse, Models 2008, Toulouse, France, Sept. 28, 2008
4. Domain-specific Modeling Languages, OOP 2008, Munich, Germany, Jan. 25, 2008
5. Model-Driven Development, MoDELS 2006 conference, Genoa, Italy, Oct. 2-5, 2006

Panels

1. Security - Understanding Threat Vectors, Panelist, FOSE 2012, Washington D.C.
2. Model Based Systems Engineering- A solution to complexity or just a complex solution?, Panelist, DACS Webinar
3. Modeling- Is Standardization Hurting or Helping the Field?, Moderator, Models 2006, Genoa, Italy
4. Introducing Model-Driven Development into the Undergraduate Curriculum, Moderator, Models 2006, Genoa Italy

Invited Talks

1. WICAT Keynote at VT-Wireless Symposium, Blacksburg, VA, 2012
2. SPRUCE - A Case Study in Multi-Dimensional Resource Optimization using Program-scale Data, Candidate Solutions, DACS Webinar, March 2011
3. Raytheon ISaCTN Conference, Dallas, TX, April, 2010
4. IEEE Computer Society Monthly Talk at the University of Alabama at Birmingham, "Optimizing the Configuration of Software Product-line Variants," November, 2008
5. Dagstuhl Perspectives Workshop on Model-Driven Engineering of Complex Systems, "Model Intelligence," August, 2008
6. The University of Alabama at Birmingham, "The Generic Eclipse Modeling System," December, 2008
7. Vanderbilt University EECS Departmental Seminar, Nashville, TN, "Feature Model Based Application Healing," December, 2008
8. Lockheed Martin Advanced Technologies Lab, Cherry Hill, NJ, "Continuous Model Integration," November, 2007
9. Siemens AG, Munich, Germany, "Domain-specific Modeling Languages," June, 2007
10. Siemens AG, Munich, Germany, "Model Intelligence," June, 2007
11. Vanderbilt University EECS Departmental Seminar, Nashville, TN, "Automatic Role-based Constraint Solving," December, 2008
12. University of Waterloo, Waterloo, Canada, "Role-based Object Constraints," December, 2006
13. Siemens AG, Munich, Germany, "Automating Automotive Component Deployment," August, 2006
14. Vanderbilt University EECS Departmental Seminar, Nashville, TN, "Simplifying the Development of Product-line Customization Tools via MDD," November, 2005
15. OMG Real-time & Embedded Systems Workshop, Washington D.C., USA, "Simplifying the Development of QoS-aware EJB Applications via Model-Integrated Computing," July, 2005

16. Raytheon, Portsmouth, Rhode Island, "Simplifying the Development of Autonomic EJB Systems with MDD," April, 2005
17. Selected Software Development Accomplishments
18. Project leader for the Eclipse Foundation's Generic Eclipse Modeling System (GEMS) project, <http://www.eclipse.org/gmt/gems>.
19. Eclipse Foundation committer.



(<http://www.isis.vanderbilt.edu>)



The Magnum Research Group

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GEMS Home page

Welcome

The goal of the Generic Eclipse Modeling System (GEMS) is to bridge the gap between the communities experienced with visual metamodeling tools, such as the Generic Modeling Environment (GME), and those built around the Eclipse modeling technologies, such as the Eclipse Modeling Framework (EMF) and Graphical Modeling Framework (GMF). GEMS is being developed by the Distributed Object Computing (DOC) Group at Vanderbilt University's Institute for Software Integrated Systems (ISIS) and other collaborators, such as Siemens Corporate Technology. GEMS is an open project and encourages developers to extend, enhance, and use its tools. GEMS has been developed in conjunction with research work done in collaboration with Siemens, IBM, and PrismTech. GEMS is an open source project, based on the Eclipse License.

[more about GEMS » \(about.php\)](#)

Quick Navigator

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 - [GEMS EMF Intelligence Tutorial \(http://wiki.eclipse.org/GEMS_EMF_Intelligence_Tutorial\)](http://wiki.eclipse.org/GEMS_EMF_Intelligence_Tutorial)
 - [GEMS EMF Intelligence Tutorial with Multiple Constraint Languages \(http://wiki.eclipse.org/GEMS_EMF_Intelligence_Tutorial_with_Mixed_Constraints\)](http://wiki.eclipse.org/GEMS_EMF_Intelligence_Tutorial_with_Mixed_Constraints)
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- [GEMS-based Product-line Modeling Tutorial at OOPSLA 2008 \(http://www.oopsla.org/oopsla2008/tutorials.html\)](http://www.oopsla.org/oopsla2008/tutorials.html) posted 12-11-2008
- [GEMS-based Product-line Modeling Tutorial at MODELS 2008 \(http://www.modelsconference.org/\)](http://www.modelsconference.org/) posted 12-11-2008
- [New GEMS Stylesheet Tutorial Posted \(http://wiki.eclipse.org/GEMS_Metamodeling_Tutorial\)](http://wiki.eclipse.org/GEMS_Metamodeling_Tutorial) posted 01-02-2008
- [GEMS Part of the DSMLs from Fundamentals to Emerging Challenges Tutorial at OOP 2008 \(http://www.sigs-datacom.de/sd/kongresse/oop_2008/index.php\)](http://www.sigs-datacom.de/sd/kongresse/oop_2008/index.php) posted 01-02-2008
- [New GEMS Metamodeling Tutorial Posted \(http://wiki.eclipse.org/GEMS_Metamodeling_Tutorial\)](http://wiki.eclipse.org/GEMS_Metamodeling_Tutorial) posted 31-01-2008

INCUBATION



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GETTING STARTED

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About GEMS

Introduction

The goal of the Generic Eclipse Modeling System (GEMS) is to bridge the gap between the communities experienced with visual metamodeling tools, such as the Generic Modeling Environment (GME), and those built around the Eclipse modeling technologies, such as the Eclipse Modeling Framework (EMF) and Graphical Modeling Framework (GMF). GEMS is being developed by the Distributed Object Computing (DOC) Group at Vanderbilt University's Institute for Software Integrated Systems (ISIS) and other collaborators, such as Siemens Corporate Technology. GEMS is an open project and encourages developers to extend, enhance, and use its tools. GEMS has been developed in conjunction with research work done in collaboration with Siemens, IBM, and PrismTech. GEMS is an open source project, based on the Eclipse License.

Goals

GEMS is a project aimed at bringing the deep experience in existing visual metamodeling techniques and tools, such as GME, gained by the DOC group and other researchers and developers, to the Eclipse platform and bridge the communities. GEMS is designed to provide a tool for rapidly creating Eclipse modeling tools from a visual metamodel specification with little or no coding and allow developers and users to focus on the code generation and analysis aspects of a graphical modeling tools rather than the intricate user interface code that is traditionally required for graphical modeling tools. Our intention is to bring the extensive experience of existing graphical metamodeling tool users in formal specification, analysis, simulation, modeling, and other techniques to the Eclipse platform and provide a point of integration between the two communities. The project hopes to provide a bridge in terms of use as well as interoperability between the Eclipse modeling tools and existing graphical metamodeling toolsets in the form of bi-directional model and metamodel exchange.

A key research aspect of the work will focus on enabling complex analysis, simulations, and constraint satisfaction. In particular, GEMS is specifically targeted towards addressing the scalability challenges of manual modeling approaches. A facility called Model Intelligence Guides (MIGs) is included within GEMS to simplify the integration of intelligent modeling assistance mechanisms, such as applying batch changes to a model to make it meet a set of global constraints.

Relationship with other Eclipse Tools: The graphical modeling environment, provided by GEMS, is based on EMF, Draw2D, and GEF. GEMS's goal is to be a tool that allows domain experts to quickly create graphical editors using EMF, Draw2D, and GMF. We are currently transitioning our code generators to produce GMF-based code rather than

bare Draw2D and EMF code. GEMS is a tool that allows developers to quickly and simply tie together multiple Eclipse modeling technologies with little or no Java or XML coding experience. We will continue to evolve GEMS to expose the best features of the Eclipse modeling plug-ins, such as EMF and GMF, that it is based on, while focusing on making the process of creating a DSML simple. Again, the goal of GEMS is to allow domain experts, not just Java/Eclipse developers, to create a DSML that leverages the powerful modeling frameworks for Eclipse, such as GMF and EMF, and create complex analysis, optimization, and code generation facilities.

Relationship with the Generic Modeling Environment: GEMS provides a meta-programmable modeling environment similar to GME for Eclipse. Currently, plug-ins exist for GEMS to do basic importation of GME metamodels and models into GEMS. Our goal with respect to GME is to extend GEMS to provide true bi-directional interoperability between the modeling tools.

Relationship with Other Graphical Metamodeling Tools: We encourage others to develop extensions to GEMS to interoperate with other graphical metamodeling or CASE tools, such as MetaEdit.

Context

Modeling scalability challenges for large systems. Domain-Specific Modeling Languages (DSMLs) [1], Model-Driven Engineering (MDE) [2], Model-Driven Architectures (MDA) [3], and Model Driven Development (MDD) [4] are all promising forms of system development that combine high-level visual abstractions, specific to a domain, with constraint checking and code-generation to simplify the development of a large class of system [5]. As model-based tools and methodologies have developed, however, it has become clear that there are many domains where the models are so large and the domain constraints so intricate that it is extremely difficult for a modeler to manually produce a correct or high quality model. In these domains, modeling tools that merely provide solution-correctness checking via constraints or a visual representation of the domain, provide few real benefits over a model-less approach. The true complexity in these domains is their large model sizes and the combinatorial nature of their constraints--not code construction per se. For example, specifying the deployment of software components to Electronic Control Units (ECUs, the automotive equivalent of a CPU), in a car, while observing configuration and resource constraints, even when only a few tens of model entities are present, can easily generate solution spaces with millions or more possible deployments and few correct ones. For these large modeling problems, it is impractical, if not impossible; to create a complete and valid model manually.

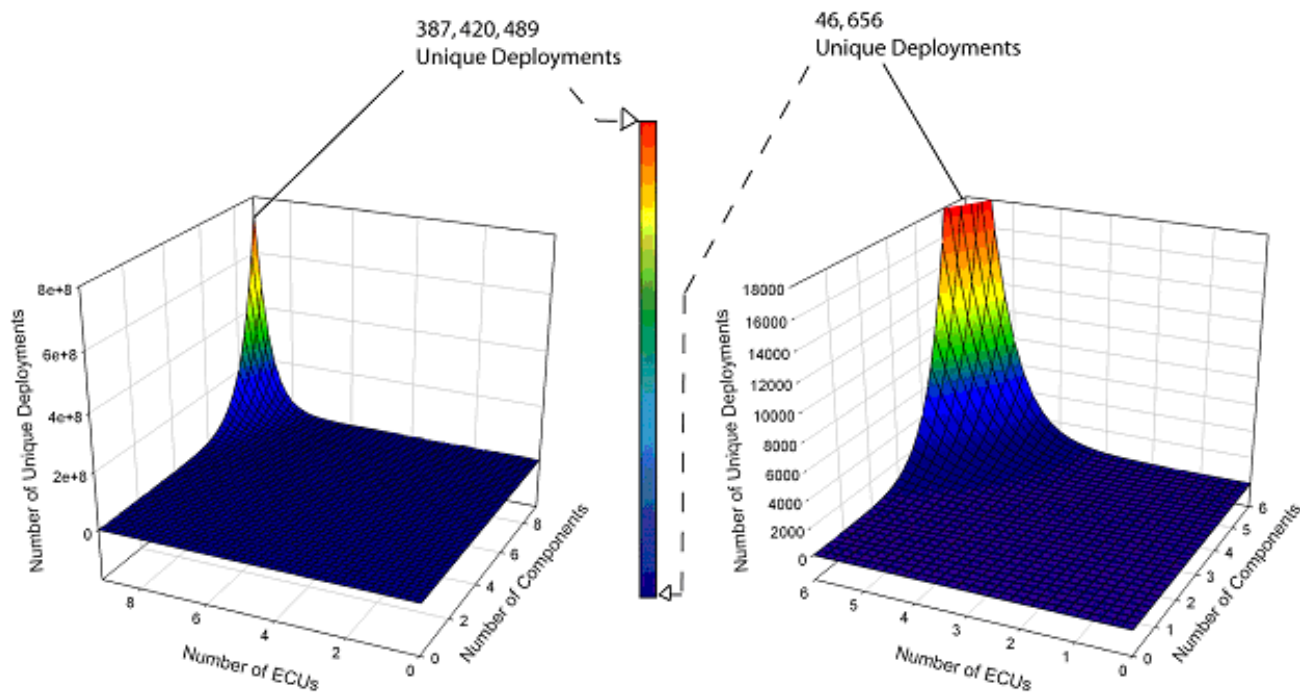


Figure 1, Comparing the Number of Unique Deployments for Two Model Sizes

Consider a group of 10 components that need to be deployed to one of 10 ECUs within a car. There are $10^{10} = 10$ billion unique deployments that could be tried. Part of the complexity of these domains is how quickly the solution spaces grow as the number of model elements increases. To visualize the speed at which the solution spaces grows for our automotive example, examine Figure 1. With 9 components and 9 ECUs we have a total of 387,420,489 unique deployments. It appears from the first figure that the solution space size is relatively flat when there are less than 6 components and 6 nodes. If you examine the second graph, however, you will see that the solution space is actually not flat at all from 0-6 components/nodes but only appears flat when scaled in comparison to 9 components/nodes. Clearly, any approach to finding a deployment that observes the deployment constraints must be efficient and employ a form of pruning to reduce the time taken to search the solution space. A manual approach may work for a model with 5 or so elements, but as can be seen from Figure 1, the solution space can increase rapidly as the number of elements grows.

Typically, each component in an automobile will have multiple constraints governing its placement. The Anti-lock Braking System (ABS) will need to be hosted by a controller at least a certain distance from the perimeter of the car. Furthermore, the ABS will have requirements governing the CPU, memory, and bus bandwidth available on its host. When these constraints are considered for all the components, it becomes difficult for a modeler to manually produce a correct solution. This example only has 10 components and 10 control units. Real automotive models typically contain 80 or more control units and hundreds of components. In models of this scale, manual approaches simply cannot handle the large numbers of possibilities and the complexity of the constraints.

GEMS is designed to allow developers to rapidly create a graphical modeling tool with no coding and immediately begin addressing the challenging aspects of these types of complex domains. GEMS provides extensive support for integrating intelligent

mechanisms into a modeling tool to provide visual modeling queues, constraint-compliant batch processing, simulation, and analysis.

Approach

Currently, GEMS is developed by a group of developers led by the DOC group. Our collaborators include Siemens Corporate Technology, IBM, PrismTech, and others. The project is open and encourages others to join its development and user community.

GEMS provides extensive support for rapidly creating graphical modeling tools for Eclipse using a visual modeling environment. The true research focus of GEMS, however, is in addressing the scalability problems of manual modeling approaches in complex and large domains. GEMS's approach to this problem is presented below.

Solution approach --> Modeling tool and constraint solver integration. To address the challenges of modeling large and complex domains, methods are needed to reduce the cost of integrating constraint solvers with modeling tools. GEMS provides a mechanism called Model Intelligence Guides (MIGs) to substantially reduce the cost of integrating a constraint solver and reduce the complexity of modeling hard domains by:

1. respecting domain-specific concepts from the modeling tool and providing a flexible mechanism for specifying solvers using domain notations. Modeling tool users are able to specify constraints in a language or notation that mirrors the domain and makes mapping requirements to the model easier.
2. leading modelers towards solutions that are considered optimal or good based on quality metrics from the domain. MIGs allows solvers to be used to iterate through multiple valid solutions and suggest only those considered most optimal. Modelers can plug-in custom formulas for measuring optimality in the target domain and the tool and MIGS can present multiple suggestions based on various types of optimization.
3. automating tedious and complex modeling tasks, such as solving for and assigning values for global constraints, performing repetitive localized decisions, or providing feedback to a modeler to suggest valid modeling decisions.
4. accommodating long-running analyses for problem instances that cannot be solved on-line.
5. providing debugging information or suggest ways to make the model tractable. In a domain that requires constraint solver assistance, it is unlikely that a manual approach will be able to find the source of intractability in a model. Thus, it is crucial that MIGs provides feedback to the modeler to facilitate debugging.

With the constraint-solver integrated modeling environment, provided by GEMS, a user goes through an iterative process of specifying portions of a model, adding or refining existing domain constraints, debugging constraints that are not tractable, and using the constraint solver to automate model construction and optimization. Figure 2 illustrates the modeling processing with an integrated constraints solver.

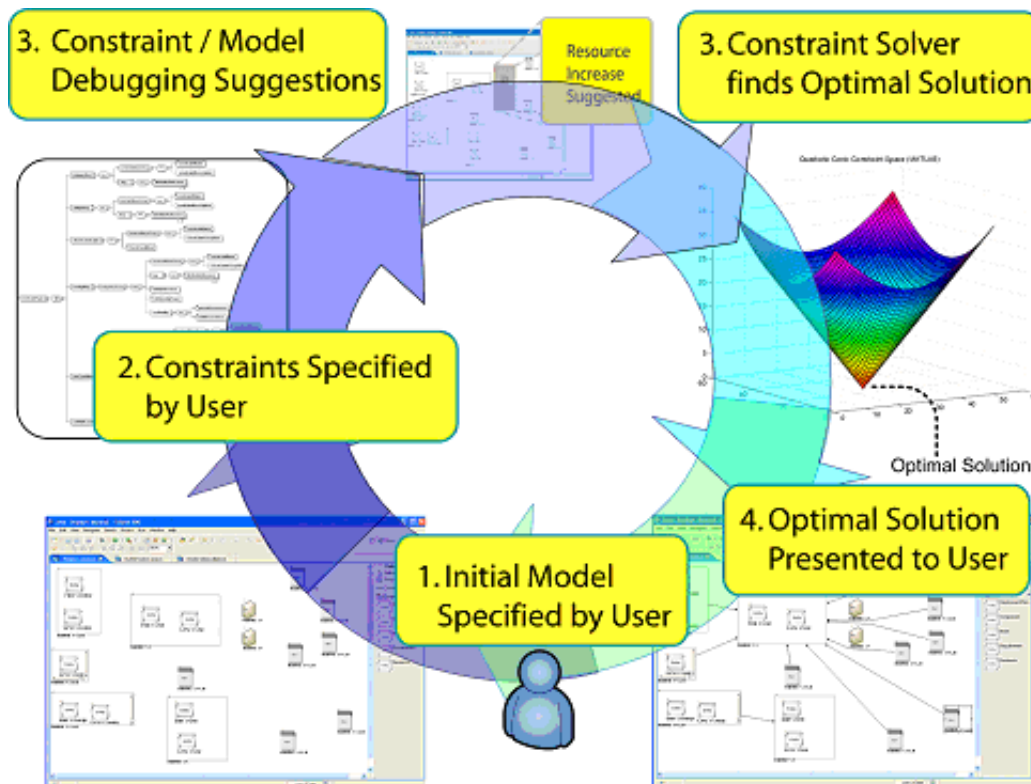


Figure 2, A Modeling Cycle with Constraint Solver Integration

MIGs can guide the user in making localized decisions by highlighting optimal or valid model modifications and decrease user effort and modeling time. MIGs can also be used to complete a batch process of model changes, such as connecting all components to a valid host, while respecting global constraints. Batch processes performed by MIGs arrive at higher quality solutions in less time than a manual approach. Finally, in situations where the partial model specified by the user, such as a listing of components and nodes they must be deployed to, cannot satisfy the domain constraints, e.g. the modeled nodes do not have sufficient resources to host the components, MIGs can suggest ways of bringing the model to a state that satisfies the domain constraints. MIGs might, for example, indicate that a particular node's available memory must be increased to satisfy a failed resource requirement.

GEMS Features

GEMS provides an extensive feature set for rapidly building graphical modeling tools including:

- A graphical language for metamodel specification that can capture
 - domain entities
 - attributes of entities
 - inheritance relationships
 - connection and containment relationships between entities
 - distinct modeling views
 - graphical information, such as connection styles, colors, and fonts

- **constraints**
- **GEMS provides extensive support for intelligent modeling guidance including**
 - **automatic solving of inference-based constraints for connection and containment**
 - **applying batch changes to a model that are guided by a set of global constraints**
 - **visually suggesting connection endpoints and element parents that conform to the specified constraints**
 - **support for simulations**
 - **mechanisms for integrating constraint solvers**
 - **mechanisms for creating re-usable templated constraint solvers**
 - **mechanisms for discovering why a model cannot meet a set of global domain constraints**
 - **graphical mechanisms for suggesting optimal modeling decisions derived from a constraint solver**
- **A code generation framework, which does not require any coding or XML editing, for transforming a GEMS metamodel into a working Draw2D/GEF Eclipse plug-in for editing instances of the language**
 - **Ecore Model**
 - **EMF Classes**
 - **GEF/Draw2D Figures**
 - **GEF/Draw2D Edit Parts**
 - **other GEF/Draw2D Infrastructure for creating the palette, etc.**
 - **plugin descriptor for the tool**
 - **build descriptor for the project**
 - **classpath descriptor for the project**
- **The visual appearance of the generated modeling tool can be customized by creating CSS stylesheets to modify the icons, colors, fonts, connection styles, and other visual attributes of the modeling entities**
- **The views available to a modeler can be customized through a mechanism similar to CSS stylesheets**
- **The generated graphical modeling plug-ins, created by GEMS, support extensive external customization through extension points for**
 - **adding code generators and transformation, such as Open Architecture Ware, Java Emitter Templates, and Atlas Transformation Language**
 - **model pre and post processing**

- **model event listeners**
- **triggers for invoking actions (similar to database triggers)**
- **constraint languages**
- **menus**
- **palette customizers**
- **intelligent modeling guides**
- **model serializers**
- **GEMS provides built-in support for constraints written in Java, OCL, and Prolog**
 - **constraints can also be used as triggers for invoking actions**
- **Models and constraint solvers can be accessed remotely using a built-in CORBA server**

GEMS supports many other features in addition to these. New features and functionality are continually being added to GEMS as it develops.

Target audience / End users

GEMS is currently used in various projects at Siemens, relating to AUTOSAR, and the Distributed Object Computing Group at Vanderbilt University. GEMS's target audience is developers and researchers, such as those experienced with GME, who need to focus on large and complex modeling domains where analysis, simulation, and code-generation are the key challenges. GEMS is also targeted towards users who want to create graphical modeling tools for Eclipse from a visual metamodel specification without any XML/Draw2D/GEF coding. As the project develops, our goal is to focus on continuing to improve the mechanisms for providing modeling guidance and the visual stylability of the generated tools.

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Background

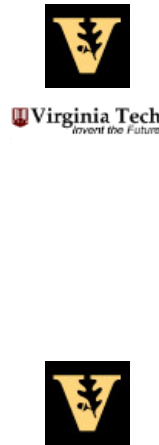
Experience

Research Assistant
Vanderbilt University

Assistant Professor
Virginia Tech
2010 – Present (6 years)

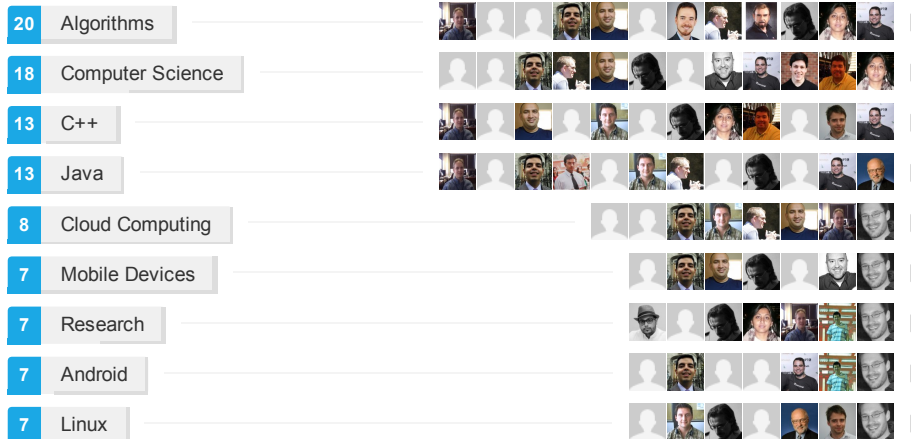
Assistant Professor
Vanderbilt University
2013 – 2015 (2 years)

Research Assistant Professor
Vanderbilt University
2008 – 2010 (2 years)



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