

## Resume

Jason O. Hallstrom

## Personal Data

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## Education

- Ph.D., Ohio State University, 2004, Computer and Information Science
- M.S., Ohio State University, 2004, Computer and Information Science
- M.A., Miami University, 1998, Economics
- B.S., Miami University, 1998, Systems Analysis

## Professional Experience

- Clemson University, 2004 — present, Assistant Professor of Computer Science.

## Consulting Experience

- Metavante Corporation (Willowbrook, Illinois), 1995 — 2006, lead developer of various systems, including enterprise system architectures.

## Publications

### Refereed Book Chapters (Full Chapter Reviews)

1. Soundarajan, N., Hallstrom, J.O., “Precision, Flexibility, and Tool Support: Essential Elements of Pattern Formalization”, *Design Pattern Formalization Techniques*, Toufik Taibi (ed.), Idea Group Inc., 280 — 301, (2007).

### Refereed Journal Publications (Full Paper Reviews)

2. Eidson, G.W., Esswein, S.T., Gemmill, J.B., Hallstrom, J.O., Howard, T.R., Post, C.J., Sawyer, C.T., Wang, K.-C., White, D.L., “The South Carolina Digital Watershed”, *International Journal of Distributed Sensor Networks*, (to appear)<sup>1</sup>.

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<sup>1</sup>An extended version of this paper was published in the *Proceedings of the 4<sup>th</sup> International Symposium on Innovations and Real-time Applications of Distributed Sensor Networks* under the title “The South Carolina Digital

3. Dalton, A.R., Hallstrom, J.O., Zia, H.A., Sridhar, N., “Reducing the Impact of Link Quality Variation in Embedded Wireless Networks”, *Ad Hoc & Sensor Wireless Networks*, 7(3-4), 139–167, (2009)<sup>2</sup>.
4. Dalton, A.R., Wahba, S.K., Dandamudi, S., Hallstrom, J.O., “Visualizing the Runtime Behavior of Embedded Network Systems”, *Science of Computer Programming (Special Issue: Selected Papers from ICPC’08)*, 74(7), 446–469, (May 2009)<sup>3</sup>.
5. Dalton, A.R., Hallstrom, J.O., “An Interactive, Source-Centric, Open Testbed for Developing and Profiling Wireless Sensor Systems”, *International Journal of Distributed Sensor Networks*, 5(2), 105–138, (April 2009).
6. Dalton, A.R., Hallstrom, J.O., “nAIT: A Source Analysis and Instrumentation Framework for nesC”, *Journal of Systems and Software*, 82(7), 1057–1212, (January 2009).
7. Soundarajan, N., Hallstrom, J.O., Shu, G., Delibas, A., “Patterns: From System Design to Software Testing”, *Innovations in Systems and Software Engineering (Special Issue: Selected Papers from SEW-31) (A NASA Journal)*, 4(1), 71–85, (April 2008)<sup>4</sup>.
8. Arora, A., Gouda, M., Hallstrom, J.O., Herman, T., Leal, W.M., Sridhar, N., “A State-Based Language for Sensor-Actuator Networks”, *SIGBED Review (Special Issue: The Workshop on Wireless Sensor Network Architecture)*, 4(3), 6p., (April 2007).
9. Dean, T.M., Dunning, S.H., Dowding, G.A., Hallstrom, J.O., “An RPC Design for Wireless Sensor Networks”, *International Journal of Pervasive Computing and Communications (Special Issue: Key Technologies and Applications of Wireless Sensor and Body-Area Networks)*, 2(4), 384 — 397, (December 2006)<sup>5</sup>.
10. Hallstrom, J.O., Sridhar, N., Sivilotti, P.A.G., Arora, A., Leal, W.M., “A Container-Based Approach to Object-Oriented Product Lines”, *Journal of Object Technology*, 3(4), 161 — 175, (April 2004).
11. Hallstrom, J.O., Leal, W.M., Arora A., “Scalable Evolution of Highly-Available Systems”, *IEICE/IEEE Joint Special Issue on Assurance Systems and Networks*, E86-D(10), 2154 — 2166, (October 2003).

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Watershed: End-to-End Support for Realtime Management of Water Resources”, as cited in the next section. The condensed journal manuscript, invited based on the symposium paper, was accepted by the journal editor without a second round of anonymous review.

<sup>2</sup>A preliminary version of this paper was published in the *Proceedings of the 3<sup>rd</sup> International Workshop on Dependable Embedded Systems* under the title “Improving Network Link Quality in Embedded Wireless Systems”, as cited in the next section.

<sup>3</sup>A preliminary version of this paper was published in the *Proceedings of the 16<sup>th</sup> International Conference on Program Comprehension* under the title “A Toolkit for Visualizing the Runtime Behavior of TinyOS Applications”, as cited in the next section.

<sup>4</sup>A preliminary version of this paper was published in the *Proceedings of the 31<sup>st</sup> Annual IEEE/NASA Software Engineering Workshop* under the title “Testing Patterns”, as cited in the next section. The extended manuscript, invited based on the workshop paper, was accepted by the journal editor without a second round of anonymous review.

<sup>5</sup>A preliminary version of this paper was published in the *Proceedings of the IEEE International Workshop on Heterogeneous Multi-Hop Wireless and Mobile Networks*, as cited in the next section. The extended manuscript was invited based on the workshop paper; an additional anonymous review of the extended manuscript was received.

12. Hallstrom, J.O., Soundarajan, N., “Incremental Development Using Object-Oriented Frameworks: A Case Study”, *Journal of Object Technology (Special Issue: TOOLS USA 2002 Proceedings)*, 1(3), 189 — 205, (August 2002).

### Refereed Conference and Workshop Publications (Full Paper Reviews)<sup>6</sup>

13. Hallstrom, J.O., Soundarajan, N., “Reusing Patterns through Design Refinement”, *Proceedings of the 11<sup>th</sup> International Conference on Software Reuse*, Falls Church, VA, (to appear), (September 2009) [acceptance rate: 41%].
14. Sitaraman, M., Hallstrom, J.O., White, J., Drachova-Strang, S., Harton, H., Leonard, D.P., Krone, J., Pak, R., “Engaging Students in Specification and Reasoning: ‘Hands-On’ Experimentation and Evaluation”, *Proceedings of the 14<sup>th</sup> ACM-SIGCSE Annual Conference on Innovation and Technology in Computer Science Education*, Paris, France, 50–54, (July 2009) [acceptance rate: 32%].
15. Sridhar, N., Hallstrom, J.O., “A Specification Idiom for Reactive Systems”, *Companion Proceedings of the 31<sup>st</sup> International Conference on Software Engineering (New Ideas and Emerging Results Track)*, Vancouver, Canada, 267–270, (May 2009) [acceptance rate: 33%].
16. Eidson, G.W., Esswein, S.T., Gemmill, J.B., Hallstrom, J.O., Howard, T.R., Post, C.J., Sawyer, C.T., Wang, K.-C., White, D.L., “The South Carolina Digital Watershed: End-to-End Support for Realtime Management of Water Resources”, *Proceedings of the 4<sup>th</sup> International Symposium on Innovations and Real-time Applications of Distributed Sensor Networks*, Hangzhou, P.R. China, 9–16, (May 2009) [acceptance rate:  $\approx 20\%$ ]<sup>7</sup><sup>8</sup>.
17. Malloy, B.A., Sitaraman, M., Hallstrom, J.O., “Detecting Overflow Vulnerabilities using Automated Verification”, *Proceedings of the Cyber-Security and Information Intelligence Workshop (at Oak Ridge National Laboratory and UT-Knoxville)*, Oak Ridge, TN, #22, (April 2009) [acceptance rate: 75%]<sup>9</sup>.
18. Leonard, D.P., Hallstrom, J.O., Sitaraman, M., “Injecting Rapid Feedback and Collaborative Reasoning in Teaching Specifications”, *Proceedings of the 40<sup>th</sup> ACM Technical Symposium on Computer Science Education*, Chattanooga, TN, 524–528, (March 2009) [acceptance rate: 33%].
19. Hallstrom, J.O., Soundarajan, N., “Formalizing Design Patterns: A Comprehensive Contract for Composite”, *Proceedings of the 7<sup>th</sup> FSE Workshop on the Specification and Verification of Component-Based Systems*, Atlanta, GA, 77–82, (November 2008) [acceptance rate: 100%].
20. Dalton, A.R., McCartney, W.P., GhoshDastidar, K., Hallstrom, J.O., Sridhar, N., Herman, T., Leal, W.M., Arora, A., Gouda, M., “DESAL<sup>α</sup>: An Implementation of the Dynamic

<sup>6</sup>Acceptance rates were collected from conference proceedings, conference websites, and personal communications with conference organizers. All percentages reflect acceptance rates of *full papers*, accepted based on full paper reviews.

<sup>7</sup>A precise acceptance rate is not available. The estimate was derived by dividing the number of accepted full papers by the estimated number of submissions, as reported by Dr. Qishi Wu, one of the conference organizers. The estimate is conservative; the actual acceptance rate was likely below 20%.

<sup>8</sup>An abbreviated version of this manuscript has been accepted for publication in the *International Journal of Distributed Sensor Networks* under the title “The South Carolina Digital Watershed”, as cited in the previous section.

<sup>9</sup>While manuscript submissions were reviewed for selection purposes, reviewer comments were not provided to authors.

- Embedded Sensor-Actuator Language”, *Proceedings of the 17<sup>th</sup> International Conference on Computer Communications and Networks*, St. Thomas, U.S. Virgin Islands, 7pp. (CD-ROM), (August 2008) [acceptance rate: 26%].
21. Wahba, S.K., Dandamudi, S., Dalton, A.R., Hallstrom, J.O., “NePTune: A New Approach to Sensor Network Optimization”, *Proceedings of the 17<sup>th</sup> International Conference on Computer Communications and Networks*, St. Thomas, U.S. Virgin Islands, 7pp. (CD-ROM), (August 2008) [acceptance rate: 26%].
  22. Dalton, A.R., Dandamudi, S., Hallstrom, J.O., Wahba, S.K., “A Testbed for Visualizing Sensornet Behavior”, *Proceedings of the 17<sup>th</sup> International Conference on Computer Communications and Networks*, St. Thomas, U.S. Virgin Islands, 7pp. (CD-ROM), (August 2008) [acceptance rate: 26%].
  23. Duffy, E., Hallstrom, J.O., Malloy, B.A., “Reverse Engineering Interface Protocols for Comprehension of Large C++ Libraries During Code Evolution Tasks”, *Proceedings of the 20<sup>th</sup> International Conference on Software Engineering and Knowledge Engineering*, San Francisco, CA, 303–308, (July 2008) [acceptance rate: 48%<sup>10</sup>]<sup>11</sup>.
  24. Dalton, A.R., Hallstrom, J.O., “A Toolkit for Visualizing the Runtime Behavior of TinyOS Applications”, *Proceedings of the 16<sup>th</sup> IEEE International Conference on Program Comprehension*, Amsterdam, Netherlands, 43–52, (June 2008) [acceptance rate: 35%]<sup>12</sup>.
  25. Soundarajan, N., Dovland, J., Hallstrom, J.O., “Tracing Correct Usage of Design Patterns”, *Proceedings of the 11<sup>th</sup> IASTED International Conference on Software Engineering and Applications*, Cambridge, MA, 163–167, (November 2007) [acceptance rate: 36%].
  26. Wahba, S.K., LaForce, K.D., Fisher, J.L., Hallstrom, J.O., “An Empirical Evaluation of Embedded Link Quality”, *Proceedings of the International Conference on Sensor Technologies and Applications*, Valencia, Spain, 430–435, (October 2007) [acceptance rate: 34%].
  27. Dalton, A.R., Hallstrom, J.O., “A File System Abstraction and Shell Interface for a Wireless Sensor Network Testbed”, *Proceedings of the 3<sup>rd</sup> International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities*, Orlando, FL, 1–10, (May 2007) [acceptance rate: 40%].
  28. Soundarajan, N., Hallstrom, J.O., Delibas, A., Shu, G., “Testing Patterns”, *Proceedings of SEW-31: the 31<sup>st</sup> Annual IEEE/NASA Software Engineering Workshop*, Baltimore, MD, 109–120, (March 2007) [acceptance rate:  $\approx 40\%$ ]<sup>13</sup><sup>14</sup>.
  29. Dalton, A.R., Hallstrom, J.O., Zia, H.A., Sridhar, N., “Improving Network Link Quality in Embedded Wireless Systems”, *Proceedings of the 3<sup>rd</sup> International Workshop on Dependable*

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<sup>10</sup>According to the SEKE Secretariat, this paper ranked among the top 2% of all submitted papers.

<sup>11</sup>An extended version of this manuscript has been submitted to the *International Journal of Software and Knowledge Engineering* under the title “Capturing Interface Protocols for Comprehension and Evaluation of C++ Libraries”.

<sup>12</sup>An extended version of this manuscript was published in the *Science of Computer Programming* journal under the title “Visualizing the Runtime Behavior of Embedded Network Systems”, as cited in the previous section.

<sup>13</sup>A precise acceptance rate is unavailable. According to the conference organizer, Dr. Mike Hinchey, the acceptance rate is approximately 1 in 2.5.

<sup>14</sup>An extended version of this paper was published in the NASA journal *Innovations in Systems and Software Engineering* under the title “Patterns: From System Design to Software Testing”, as cited in the previous section.

- Embedded Systems*, Leeds, UK, 43 — 48, (October 2006) [acceptance rate: 35%]<sup>15</sup>.
30. Hallstrom, J.O., Dalton, A.R., Soundarajan, N., “Parallel Monitoring of Design Pattern Contracts”, *Proceedings of the 18<sup>th</sup> International Conference on Software Engineering and Knowledge Engineering*, San Francisco, CA, 236 — 241, (July 2006) [acceptance rate: 42%].
  31. Soundarajan, N., Hallstrom, J.O., “Pattern-Based System Evolution: A Case-Study”, *Proceedings of the 18<sup>th</sup> International Conference on Software Engineering and Knowledge Engineering*, San Francisco, CA, 321 — 326, (July 2006) [acceptance rate: 42%].
  32. Sridhar, N., Hallstrom, J.O., “Container-Based Component Deployment: A Case-Study”, *Proceedings of the 18<sup>th</sup> International Conference on Software Engineering and Knowledge Engineering*, San Francisco, CA, 274 — 277, (July 2006) [acceptance rate: 42%].
  33. Howard, S., Hallstrom, J.O., “Specifying and Enforcing Resource Utilization Constraints”, *Proceedings of EmNets-III: The 3<sup>rd</sup> Workshop on Embedded Networked Sensors*, Cambridge, MA, 31 — 35, (May 2006) [acceptance rate: 35%].
  34. Tyler, B., Hallstrom, J.O., Soundarajan, N., “A Comparative Study of Monitoring Tools for Pattern-Centric Behavior”, *Proceedings of SEW-30: the 30<sup>th</sup> Annual IEEE/NASA Software Engineering Workshop*, Columbia, MD, 37 — 46, (April 2006) [acceptance rate:  $\approx 29\%$ ]<sup>16</sup>.
  35. Tyler, B., Hallstrom, J.O., Soundarajan, N., “Automated Generation of Monitors for Pattern Contracts”, *Proceedings of the 21<sup>st</sup> ACM Symposium on Applied Computing*, Dijon, France, 1779 — 1784, (April 2006) [acceptance rate: 30%].
  36. Hallstrom, J.O., Soundarajan, N., and Tyler, B., “Amplifying the Benefits of Design Patterns: From Specification through Implementation”, *Proceedings of FASE’06: Fundamental Approaches to Software Engineering* (part of *ETAPS’06: European Joint Conferences on Theory and Practice of Software*), Vienna, Austria, 214 — 229, (March 2006) [acceptance rate: 17%].
  37. Sridhar, N., Hallstrom, J.O., “A Behavioral Model for Software Containers”, *Proceedings of FASE’06: Fundamental Approaches to Software Engineering* (part of *ETAPS’06: European Joint Conferences on Theory and Practice of Software*), Vienna, Austria, 139 — 154, (March 2006) [acceptance rate: 17%].
  38. Dean, T.M., Dunning, S.H., Hallstrom, J.O., “An RPC Design for Wireless Sensor Networks”, *Proceedings of the IEEE International Workshop on Heterogeneous Multi-Hop Wireless and Mobile Networks*, Washington, DC, 131 — 138, (November 2005) [acceptance rate: 41%]<sup>17</sup>.
  39. Jamieson, A.C., Kraft, N.A., Hallstrom, J.O., Malloy, B.A., “A Metric Evaluation of Game Application Software”, *Proceedings of the International Conference on the Future of Game Design and Technology*, East Lansing, MI, 10pp. (CD-ROM), (October 2005) [acceptance rate: 70%].

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<sup>15</sup>An extended version of this manuscript was published in the *Ad Hoc & Sensor Wireless Networks* journal under the title “Reducing the Impact of Link Quality Variation in Embedded Wireless Networks”, as cited in the previous section.

<sup>16</sup>A precise acceptance rate is unavailable. According to the conference organizer, Dr. Mike Hinchey, the acceptance rate is approximately 1 in 3.5.

<sup>17</sup>An extended version of this paper was published in the *International Journal of Pervasive Computing and Communications*, as cited in the previous section.

40. Hallstrom, J.O., Soundarajan, N., “Reasoning About Design Patterns: A Case Study”, *Proceedings of the 8<sup>th</sup> IASTED International Conference on Software Engineering and Applications*, Cambridge, MA, 362 — 367, (November 2004) [acceptance rate: 50%].
41. Kumar, S., Weide, B.W., Sivilotti, P.A.G., Sridhar, N., Hallstrom, J.O., Pike, S.M., “Encapsulating Concurrency as an Approach to Unification”, *Proceedings of the 3<sup>rd</sup> FSE Workshop on the Specification and Verification of Component-Based Systems*, Newport Beach, CA, 10 — 17, (October 2004) [acceptance rate: 43%].
42. Soundarajan, N., Hallstrom, J.O., Tyler, B., “Monitoring Design Pattern Contracts”, *Proceedings of the 3<sup>rd</sup> FSE Workshop on the Specification and Verification of Component-Based Systems*, Newport Beach, CA, 87 — 93, (October 2004) [acceptance rate: 43%].
43. Soundarajan, N., Hallstrom, J.O., “Responsibilities and Rewards: Specifying Design Patterns”, *Proceedings of the 26<sup>th</sup> International Conference on Software Engineering*, Edinburgh, Scotland, 666 — 675, (May 2004) [acceptance rate: 13%].
44. Sridhar, N., Hallstrom, J.O., “Generating Configurable Containers for Component-Based Software”, *Proceedings of the 6<sup>th</sup> ICSE Workshop on Component-Based Software Engineering*, Portland, OR, (May 2003) [acceptance rate: 50%].
45. Chakravarti, A.J., Wang, X., Hallstrom, J.O., Baumgartner, G., “Implementation of Strong Mobility for Multi-Threaded Agents in Java”, *Proceedings of the 2003 International Conference on Parallel Processing*, Kaohsiung, Taiwan, 321 — 330, (October 2003) [acceptance rate: 36%].
46. Hallstrom, J.O., Pike, S.M., Sridhar, N., “Iterators Reconsidered”, *Proceedings of the 5<sup>th</sup> ICSE Workshop on Component-Based Software Engineering*, Orlando, FL, (May 2002) [acceptance rate: na].
47. Wang, X., Hallstrom, J.O., Baumgartner, G., “Reliability Through Strong Mobility”, *Proceedings of the 7<sup>th</sup> ECOOP Workshop on Mobile Object Systems: Development of Robust and High Confidence Agent Applications*, Budapest, Hungary, (June 2001) [acceptance rate:  $\approx 50\%$ <sup>18</sup>].

### Edited Volumes

48. Hallstrom, J.O., “Proceedings of the Resolve 2007 Workshop: Techniques and Tools for Verification and Instruction”, (available as technical reports CU-DSRG-06-07-00, RSRG-07-01), Clemson, SC, (June 2007).

### Invited / Unrefereed Publications

49. Geist, R.M., Hallstrom, J.O., Hitchcock, D.R., Song, B., Steele, J., “It’s a Small World: Enhancing Human Cognition through Virtual Dioramas”, *Proceedings of the 2008 South Carolina Water Resources Conference*, North Charleston, SC, 2pp. (CD-ROM), (October 2008).

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<sup>18</sup>A precise acceptance rate is unavailable. According to the conference organizer, Dr. Ciaran Bryce, the acceptance rate is approximately 1 in 2.

50. Gemmill, J.B., Eidson, G.W., Conner, W.H., Esswein, S., Flite, O., Hallstrom, J.O., Hayes, J., Hitchcock, D.R., Howard, T.R., Klaine, S.J., Post, C.J., Sawyer, C., Wang, K.-C., White, D.L., “Cyberinfrastructure for Preservation of Stream and River Ecology”, *Proceedings of the 2008 South Carolina Water Resources Conference*, North Charleston, SC, 3pp. (CD-ROM), (October 2008).
51. Esswein, S., Post, C., Hallstrom, J.O., White, D., Goasguen, S., “Application of Publish/Subscribe Messaging for Management of Streaming Water Resource Data”, *Proceedings of the 2008 South Carolina Water Resources Conference*, North Charleston, SC, 3pp. (CD-ROM), (October 2008).
52. Hallstrom, J.O., Krone, J., Pak, R., Sitaraman, M., “The Collaborative Reasoning Paradigm”, *Proceedings of the Resolve 2007 Workshop*, Clemson, SC, 22–24, (June 2007).
53. Malloy, B.A., Kraft, N.A., Hallstrom, J.O., Voas, J.M., “Improving the Predictable Assembly of Service-Oriented Architectures”, *IEEE Software*, 23(2), 12 — 15, (April 2006).

## Presentations

1. Hallstrom, J.O. (*presenter*), Soundarajan, N., “Reusing Patterns through Design Refinement”, *The 11<sup>th</sup> International Conference on Software Reuse*, Falls Church, VA, (*scheduled for September 2009*).
2. Eidson, G.W., Esswein, S.T., Gemmill, J.B., Hallstrom, J.O. (*presenter*), Howard, T.R., Post, C.J., Sawyer, C.T., Wang, K.-C., White, D.L., “The South Carolina Digital Watershed: End-to-End Support for Realtime Management of Water Resources”, *The 4<sup>th</sup> International Symposium on Innovations and Real-time Applications of Distributed Sensor Networks*, Hangzhou, P.R. China, (May 2009).
3. Hallstrom, J.O. (*presenter*), Krone, J., Sitaraman, M. (*presenter*), “Courseware for Teaching Analytical Reasoning Principles: A Hands-On Laboratory” (Workshop), *The 4<sup>th</sup> ACM Southeast Regional Conference*, Clemson, SC, (March 2009).
4. Hallstrom, J.O. (*presenter*), “Environmental Science as a Context for Sensor Networking and Programming Languages Research”, *The University of Delaware Computer and Information Sciences Department, Special Interest Group on Networking*, Newark, DE, (March 2009).
5. Leonard, D.P., Hallstrom, J.O. (*presenter*), Sitaraman, M., “Injecting Rapid Feedback and Collaborative Reasoning in Teaching Specifications”, *The 4<sup>th</sup> ACM Technical Symposium on Computer Science Education*, Chattanooga, TN, (March 2009).
6. Hallstrom, J.O. (*presenter*), Sitaraman, M. (*presenter*), Krone, J. (*presenter*), Pak, R., “Computer-Aided Collaborative Reasoning across the Curriculum”, Invited Poster Presentation, *NSF CCLI Showcase at SIGCSE’09*, Chattanooga, TN, (March 2009).
7. Bingham, T.G., Dalton, A.R., Dandamudi, S., Geist, R.M., Hallstrom, J.O. (*presenter*), Hitchcock, D.R., Song, B., Steele, J., Wahba, S.K., “Scaling-Up: Challenges for Planetary-Scale Earth Observation Networks”, *Intelligent River Project Overview (Meeting with the*

- Clemson University Board of Trustees*), Clemson, SC, (October 2008)<sup>19,20</sup>.
8. Sridhar, N., Hallstrom, J.O. (*presenter*), “Specifying Reactive Systems”, Invited Poster Presentation, *The 7<sup>th</sup> FSE Workshop on the Specification and Verification of Component-Based Systems*, Atlanta, GA, (November 2008).
  9. Geist, R.M., Hallstrom, J.O. (*presenter*), Hitchcock, D.R., Song, B., Steele, J., “It’s a Small World: Enhancing Human Cognition through Virtual Dioramas”, *The 2008 South Carolina Water Resources Conference*, North Charleston, SC, (October 2008).
  10. Bingham, T.G., Dalton, A.R., Dandamudi, S., Geist, R.M., Hallstrom, J.O. (*presenter*), Hitchcock, D.R., Song, B., Steele, J., Wahba, S.K., “Scaling-Up: Challenges for Planetary-Scale Earth Observation Networks”, *Intelligent River Project Overview (Meeting with Duke Energy)*, Charlotte, NC, (September 2008)<sup>21</sup>.
  11. Bingham, T.G., Dalton, A.R., Dandamudi, S., Geist, R.M., Hallstrom, J.O. (*presenter*), Hitchcock, D.R., Song, B., Steele, J., Wahba, S.K., “Challenges for Planetary-Scale Earth Observation Networks”, *Clemson PSA Cyberinfrastructure Project Review*, Georgetown, SC, (August 2008).
  12. Hallstrom, J.O. (*presenter*), Sitaraman, M. (*presenter*), Krone, J. (*presenter*), Pak, R., “Computer-Aided Collaborative Reasoning across the Curriculum”, Invited Poster Presentation, *NSF CCLI PI Conference*, Washington, DC, (August 2008).
  13. Dalton, A.R., Hallstrom (*presenter*), J.O., “A Toolkit for Visualizing the Runtime Behavior of TinyOS Applications”, *The 16<sup>th</sup> IEEE International Conference on Program Comprehension*, Amsterdam, Netherlands, (June 2008).
  14. Dalton (*presenter*), A.R., Hallstrom (*presenter*), J.O., “NESTbed: A Networked Embedded Sensor Testbed for Multi-Modal Experimentation, Debugging, and Profiling”, *The 3<sup>rd</sup> International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities*, Orlando, FL, (May 2007).
  15. Hallstrom (*presenter*), J.O., “Introduction to Wireless Sensor Networks”, *The Miami University Computer Science and Systems Analysis Alumni Conference*, Oxford, OH, (March 2007).
  16. Chang (*presenter*), T., Gilbert (*presenter*), J., Patel (*presenter*), D., Hallstrom (*presenter*), J.O., “Should You Pursue Graduate School?”, *The Miami University Computer Science and Systems Analysis Alumni Conference*, Oxford, OH, (March 2007).
  17. Dalton (*presenter*), A.R., Hallstrom (*presenter*), J.O., “DESAL: Dynamic Embedded Sensing and Actuation Language – Notes on a Prototype Implementation”, *DESAL Retreat (Annual NSF NeTS-NOSS Project Meeting)*, Columbus, OH, (February 2007).

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<sup>19</sup>An earlier version of this talk was presented at the *Intelligent River Project Overview Meeting with Duke Energy*, as cited below.

<sup>20</sup>An earlier version of this talk was presented at the *Clemson PSA Cyberinfrastructure Project Review* under the title “Challenges for Planetary-Scale Earth Observation Networks”, as cited below.

<sup>21</sup>An earlier version of this talk was presented at the *Clemson PSA Cyberinfrastructure Project Review* under the title “Challenges for Planetary-Scale Earth Observation Networks”, as cited below.

18. Soundarajan, N., Hallstrom (*presenter*), J.O., “Pattern-Based System Evolution: A Case-Study”, Paper Presentation, *The 18<sup>th</sup> International Conference on Software Engineering and Knowledge Engineering*, San Francisco, CA, (July 2006).
19. Tyler, B., Hallstrom (*presenter*), J.O., Soundarajan, N., “Automated Generation of Monitors for Pattern Contracts”, *The 21<sup>st</sup> ACM Symposium on Applied Computing*, Dijon, France, (April 2006).
20. Hallstrom (*presenter*), J.O., Soundarajan, N., Tyler, B., “Amplifying the Benefits of Design Patterns: From Specification through Implementation”, *FASE’06: Fundamental Approaches to Software Engineering* (part of *ETAPS’06: European Joint Conferences on Theory and Practice of Software*), Vienna, Austria, (March 2006).
21. Hallstrom (*presenter*), J.O., “DESAL: Dynamic Embedded Sensing and Actuation Language”, *DESAL Retreat (Annual NSF NeTS-NOSS Project Meeting)*, Columbus, OH, (December 2005).
22. Hallstrom (*presenter*), J.O., McGregor, J.D., “Testing Sensor Network Applications”, Invited Presentation, *Virginia Tech-Clemson Workshop on Networking Research*, Blacksburg, VA, (April 2005).
23. Hallstrom (*presenter*), J.O., Soundarajan, N., “Formal Specification of Design Patterns: A Case Study”, Paper Presentation, *The 8<sup>th</sup> IASTED International Conference on Software Engineering and Applications*, Cambridge, MA, (November 2004).
24. Arora A., Leal, W.M., Hallstrom (*presenter*), J.O., and Sridhar, N., “DESAL: Dynamic Embedded Sensor/Actuator Language”, Invited Poster Presentation, *Microsoft Research Embedded RFP Final Workshop*, Cambridge, UK, (September 2004).
25. Hallstrom (*presenter*), J.O., Leal (*presenter*), W.M., Arora (*presenter*), A., “Scalable Evolution of Highly-Available Systems”, Invited Demonstration, *Microsoft Research Faculty Summit*, Redmond, VA, (July 2003).
26. Hallstrom (*presenter*), J.O., Pike, S.M., Sridhar, N., “Iterators Reconsidered”, Paper Presentation, *The 5<sup>th</sup> ICSE Workshop on Component-Based Software Engineering*, Orlando, FL, (May 2002).

## Honors and Awards

- Eidson, G.W., Esswein, S.T., Gemmill, J.B., Hallstrom, J.O., Howard, T.R., Post, C.J., Sawyer, C.T., Wang, K.-C., White, D.L., *S.S. Iyengar Best Paper Award* for “The South Carolina Digital Watershed: End-to-End Support for Realtime Management of Water Resources”, *The 4<sup>th</sup> International Symposium on Innovations and Real-time Applications of Distributed Sensor Networks*, (May 2009).
- Hallstrom, J.O., *Board of Trustees Award for Faculty Excellence*, Clemson University, (2009).
- Wahba, S.K., (Hallstrom’s advisee), *Outstanding Ph.D. Student*, School of Computing, Clemson University, (2009).
- Hallstrom, J.O., *CAREER Award*, National Science Foundation, (2008).

- Dalton, A.R., (Hallstrom’s advisee), *Outstanding Graduate Research Assistant*, Graduate School, Clemson University, (2008).
- Wahba, S.K., (Hallstrom’s advisee), *Anita Borg Scholarship*, Google Corporation, (2008).
- Dalton, A.R., (Hallstrom’s advisee), *Outstanding Graduate Researcher*, College of Engineering and Science, Clemson University, (2008).
- Dalton, A.R., Hallstrom, J.O., *Best Testbed Award*, The 3<sup>rd</sup> International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities, Orlando, FL, (2007)<sup>22</sup>.
- Dalton, A.R., (Hallstrom’s advisee), *Outstanding Ph.D. Student*, School of Computing, Clemson University, (2007).
- Dunning, S.H., (Hallstrom’s advisee), *Outstanding M.S. Student*, School of Computing, Clemson University, (2007).
- May, T.D., (Hallstrom’s advisee), *Outstanding M.S. Student*, School of Computing, Clemson University, (2006).
- Hallstrom, J.O., *Outstanding Teaching Award*, Computer and Information Science, Ohio State University, (2002).
- Hallstrom, J.O., *Upsilon Phi Epsilon*, Ohio State University Chapter, (2000).
- Hallstrom, J.O., *Phi Kappa Phi*, Miami University Chapter, (1997).
- Hallstrom, J.O., *Scholar Leader Award*, Miami University, (1995).
- Hallstrom, J.O., *Harrison Scholar Award*, Miami University, (1994 — 1998).

## Sponsored Research<sup>23</sup>

- “Stormwater Infiltration Design and Construction, Aiken Green Infrastructure”, *EPA (through SC DHEC and the City of Aiken, SC)*, 1/1/2010 — 12/31/2010, \$419,541 (Hallstrom’s Share: ≈\$62,425), Gene W. Eidson (Clemson; PI), Victoria T. Chanse (Clemson; co-PI), Jason O. Hallstrom (Clemson; co-PI), Daniel R. Hitchcock (Clemson; co-PI), Christopher J. Post (Clemson; co-PI), Bradley J. Putman (Clemson; co-PI), Calvin B. Sawyer (Clemson; co-PI), David L. White (Clemson; co-PI).
- “REU Supplement: Embedded Network Systems in Context: The South Carolina Digital Watershed”, *Supplement to NSF Award CNS-0745846 (CAREER)*, 9/1/2008 — 8/31/2013, Total: \$16,000, Jason O. Hallstrom (Clemson; PI — 100%).

<sup>22</sup>This award was received in recognition of our demonstration “NESTbed: A Networked Embedded Sensor Testbed for Multi-Modal Experimentation, Debugging, and Profiling”. According to the conference website, “A Best Testbed Award will be assigned to the research infrastructure that will best implement the open infrastructure model, so that to offer the greatest valuable service to the public, and the most sustainable business model to the infrastructure managers.”

<sup>23</sup>Totals reflect budgets across *all* participating universities. Participation percentages reflect percentage of participation across all *Clemson* participants.

- “Student Travel Grant for Doctoral Symposium at ICSR-11”, *NSF Award CCF-0938053 (Special Projects)*, 6/15/09 — 12/31/09, Total: \$7,800, Gregory W. Kulczycki (Virginia Tech; PI), Jason O. Hallstrom (Clemson; co-PI — na)<sup>24</sup>.
- “CAREER: Supporting Patterns for Embedded Network Systems”, *NSF Award CNS-0745846 (CAREER)*, 9/1/2008 — 8/31/2013, Total: \$400,000, Jason O. Hallstrom (Clemson; PI — 100%).
- “Intelligent River Project (PSA Data Acquisition Network)”, *Clemson University PSA*, 1/15/2008 — 9/30/2009, Total: \$1,483,826 (Hallstrom’s Share: ≈\$67,000), Gene W. Eidson (Clemson; PI), Chris J. Post (Clemson; co-PI), William H. Conner (Clemson; co-PI), Oscar Flite (Clemson; co-PI), Jill B. Gemmill (Clemson; co-PI), Jason O. Hallstrom (Clemson; co-PI — na), Daniel R. Hitchcock (Clemson; co-PI), Tim R. Howard (Clemson; co-PI), Steve J. Klaine (Clemson; co-PI), Kuang-Ching Wang (Clemson; co-PI), David L. White (Clemson; co-PI), Jon Van Bergen (Clemson; co-PI).
- “Sensor-Enabled Game Design”, *Clemson University (Creative Inquiry Program)*, 8/22/2007 — 6/30/2008, Total: \$10,000, Jason O. Hallstrom (Clemson; PI — 50%), Brian A. Malloy (Clemson; PI).
- “Collaborative Research: Computer-Aided Collaborative Reasoning across the Curriculum”, *NSF Award DUE-0633506 (CCLI-Phase I: Exploratory)*, 4/15/2007 — 3/31/2010, Total: \$149,861 (Clemson Share: \$125,237), Jason O. Hallstrom (Clemson; PI — 45%), Murali Sitaraman (Clemson; co-PI), Chong (Richard) Pak (Clemson; co-PI), Joan Krone (Denison; co-PI).
- “Specification and Analysis of Performance Constraints for Flight Software”, *South Carolina Space Grant Consortium (NASA EPSCoR)*, 12/1/2005 — 6/30/2007, Total: \$44,575, Murali Sitaraman (Clemson; PI), Jason O. Hallstrom (Clemson; co-PI — 30%).
- “Collaborative Research: NeTS-NOSS: State-Based Specifications for Controlling and Configuring Sensor Networks”, *NSF Award CNS-0520222 (NeTS-NOSS)*, 9/1/2005 — 8/31/2008, Total: \$750,000 (Clemson Share: \$74,940), Ted Herman (Iowa State; PI), Mohamed G. Gouda (Texas Austin; co-PI), Anish Arora (Ohio State; co-PI), Jason O. Hallstrom (Clemson; sole subcontractor — 100%).
- “Sensor Networks as a Substrate for Undergraduate Research and Discovery”, *Clemson University (Creative Inquiry Program)*, 8/24/2005 — 6/30/2007, Total: \$10,000, Jason O. Hallstrom (Clemson; PI — 100%).
- “Dynamic Evolution and Testing of Embedded Smart Sensor Networks”, *Microsoft Research*, 7/1/2003 — 9/1/2004, Total: \$25,000, Anish Arora (Ohio State; PI), William M. Leal (Ohio State; co-PI), Jason O. Hallstrom (Ohio State; co-PI — na).

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<sup>24</sup>This project is administered solely through Virginia Tech.

## Graduate Student Advising

### Current Students<sup>25</sup>

1. Dandamudi, S., *M.S. (Thesis)*, Thesis Topic: A Visualization Framework for Embedded Network Systems, (expected: December 2009).
2. Devabhaktuni, S.H., *M.S. (Coursework)*, (expected August 2010).
3. Jiang, H., *M.S. (Thesis)*, Thesis Topic: A Machine Learning Approach to Event Classification in Wireless Sensor Networks, (expected: August 2010).
4. Regula, K.C., *M.S. (Thesis)*, Thesis Topic: A Verifying Compiler for Embedded Network Programs, (expected: May 2010).
5. Wahba, S.K., *Ph.D.*, Dissertation Topic: Improving the Design, Implementation, and Simulation of Embedded Wireless Systems, (expected: December 2010).
6. Williams, D.A., *M.S. (Thesis)*, Thesis Topic: Embedded Network Systems, (expected: May 2011).
7. Zhang, X., *Ph.D.*, Dissertation Topic: Embedded Network Systems, (expected: May 2013).

### Former Students

1. Bauer, E., *M.S. (Coursework)*, (August 2009).
2. Dalton, A.R., *Ph.D.*, “Analysis, Instrumentation, and Visualization of Embedded Network Systems: A Testbed-Based Approach”, (August 2008)<sup>26</sup>.
3. Dean, T.M., *M.S. (Thesis)*, “An RPC Design for Wireless Sensor Networks”, (May 2006).
4. Dunning, S.H., *M.S. (Thesis)*, “XETA: A Transformation Approach for Generating Maintainable, Lightweight Middleware for Wireless Sensor Networks”, (August 2006).
5. Leonard, D.P., *M.S. (Thesis)*, “Teaching Specifications Using an Interactive Reasoning Assistant”, (May 2009).
6. Natesan, S., *M.S. (Research Experience)*, (August 2006).
7. Panduranga, V., *M.S. (Research Experience)*, (August 2006).
8. Shastri, A., *M.S. (Thesis)*, “Clustering in Wireless Sensor Networks and Self-Stabilization”, (December 2005).
9. Vasireddi, V.R., *M.S. (Research Experience)*, (May 2006).

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<sup>25</sup>All graduation dates are tentative.

<sup>26</sup>Dr. Dalton is currently employed as a tenure-track Assistant Professor in the Department of Mathematics and Computer Science at Western Carolina University.

## Teaching

### Courses Taught<sup>27</sup>

- CpSc 215, Software Development Foundations, (Spring 2008, Spring 2009).
- CpSc 372, Software Engineering, (Fall 2004, Spring 2005, Spring 2006, Spring 2007).
- CpSc 481/681, Sensor-Enabled Game Design, (Fall 2007, Spring 2008) [co-taught with B.A. Malloy].
- CpSc 481, Independent Study: Embedded Network Systems, (Fall 2006, Spring 2009, Summer 2009)
- CpSc 855, Embedded Network Systems, (Spring 2005, Spring 2006, Fall 2007, Fall 2008, Fall 2009).
- CpSc 870, Software Design, (Fall 2005, Fall 2006).
- CpSc 873, Software Verification, Validation, and Measurement, (Spring 2007).
- CpSc 950, Seminar on Embedded Network Systems, (Fall 2005, Spring 2006, Fall 2006, Spring 2007, Fall 2007, Fall 2008, Spring 2009, Fall 2009).
- CpSc 955, Programming Languages Seminar, (Spring 2005).
- CpSc 957, Software Engineering Seminar, (Spring 2005).

### New Course Development

- CpSc 481/681, Sensor-Enabled Game Design, (Fall 2007, Spring 2008) [with B.A. Malloy].
- CpSc 855, Embedded Network Systems, (Spring 2005, Spring 2006, Fall 2007, Fall 2008, Fall 2009).

## Professional and Public Service

### School Committees<sup>28</sup>

- Member, Advisory Committee, (Clemson, SoC), (2009 — present).
- Member, Honors and Awards Committee, (Clemson, SoC), (2009 – present).
- Member, Graduate Affairs Committee (Ph.D. Student Review Subcommittee), (Clemson, SoC), (2008 — 2009).
- Member, Advisory Committee, (Clemson, SoC), (2007 — 2008).
- Member, Undergraduate Affairs Committee, (Clemson, SoC), (2007 — 2008).
- Member, Director Search Committee (Clemson, SoC), (2007 — 2008).

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<sup>27</sup>In some cases, course titles have changed across semesters without a significant change in course content. The most current titles are reflected below.

<sup>28</sup>Dates of service are approximate by year.

- Member, Research Committee (Clemson, CS), (2005 — 2007).
- Member, Awards Committee (Ohio State, CIS), (2003).
- Member, Graduate Steering Committee (Ohio State, CIS), (2000 — 2002).
- Student Representative, Graduate Studies Committee (Ohio State, CIS), (2000 — 2001).

### Other Departmental Service<sup>29</sup>

- Organizer, Faculty Seminar Series (Clemson, CS), (2004 — 2006).

### Reviewing Activities<sup>30</sup>

- The 29<sup>th</sup> Conference on Computer Communications, (March 2010).
- The 18<sup>th</sup> International Conference on Computer Communications and Networks, (August 2009).
- IEEE Transactions on Parallel and Distributed Systems, (April 2009).
- The 5<sup>th</sup> International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities, (4 papers), (December 2008).
- ACM Transactions on Autonomous and Adaptive Systems, (November 2008).
- The 17<sup>th</sup> International Conference on Computer Communications and Networks, (May 2008).
- The 28<sup>th</sup> International Conference on Distributed Computing Systems, (January 2008).
- The 4<sup>th</sup> International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities, (4 papers), (December 2007).
- The International Journal of Security and Networks, (November 2007, June 2008).
- The 2007 Australasian Telecommunication Networks and Applications Conference, (September 2007).
- The 2007 International Conference on Principles and Practices of Programming in Java, (6 papers), (June 2007).
- The 27<sup>th</sup> International Conference on Distributed Computing Systems, (2 papers), (February 2007).
- Book Chapter, Formalizing Design Patterns, Toufik Taibi (ed.), Idea Group Inc., (June 2006, August 2006).
- The 6<sup>th</sup> Workshop on Language Descriptions, Tools and Applications, (January 2006).
- The 3<sup>rd</sup> ACM Conference on Embedded Networked Sensor Systems, (November 2005).
- The 2<sup>nd</sup> IEEE Workshop on Embedded Networked Sensors, (May 2005).

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<sup>29</sup>Dates of service are approximate by year.

<sup>30</sup>Each line item represents a single reviewing task, unless otherwise noted. The inclusion of multiple dates for a single citation indicates the occurrence of one or more follow-up reviews.

- IEEE Transactions on Software Engineering, (February 2005, May 2005).
- The 23<sup>rd</sup> International Conference on Distributed Computing Systems, (May 2003).
- The 1<sup>st</sup> ACM Conference on Embedded Networked Sensor Systems, (November 2003).
- The 1<sup>st</sup> ACM Workshop on Survivable and Self-Regenerative Systems, (October 2003).
- The 22<sup>nd</sup> Symposium on Reliable Distributed Systems (DES: Dependable Embedded Systems), (October 2003).
- The 22<sup>nd</sup> International Conference on Distributed Computing Systems, (July 2002).

### Other Professional Service

- Program Committee Member, The 6<sup>th</sup> International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities, (May 2010).
- Track (and Program Committee) Co-Chair, Wireless Sensor Networks and Applications Track, The 25<sup>th</sup> Annual ACM Symposium on Applied Computing, (March 2010).
- Track (and Program Committee) Co-Chair, Sensor Networks Track, The 11<sup>th</sup> International Symposium on Stabilization, Safety, and Security of Distributed Systems, (November 2009).
- Chair, Doctoral Symposium, The 11<sup>th</sup> International Conference on Software Reuse, (September 2009).
- Publicity Co-Chair, The International Conference on Wireless Algorithms, Systems, and Applications, (August 2009).
- Program Committee Member, The 1<sup>st</sup> International Workshop on Integrating the Edge with the Enterprise for Planning and Management, (June–July 2009).
- Program Co-Chair, The 4<sup>th</sup> International Innovations and Real-Time Applications of Distributed Sensor Networks Symposium, (May 2009).
- Panelist, NSF Proposal Review Panel, (April 2009).
- Program Committee Member, The 5<sup>th</sup> International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities, (April 2009).
- Track (and Technical Program Committee) Co-Chair, Wireless Sensor Networks Track (Platforms, Systems, Architectures, and Applications), The 17<sup>th</sup> International Conference on Computer Communications and Networks, (August 2008).
- Panelist, NSF Proposal Review Panel, (June 2008).
- Program Committee Member, The 4<sup>th</sup> International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities, (March 2008).
- Program Committee Member, The 2007 International Conference on Principles and Practices of Programming in Java, (September 2007).
- Workshop Co-Chair / Co-Organizer (with M. Sitaraman), The Resolve 2007 Workshop, (June 2007).

- Session Chair (Sensor Networks II), The 3<sup>rd</sup> International Conference on Testbeds and Research Infrastructures for the Development of Networks and Communities, (May 2007).
- Panelist, NSF Proposal Review Panel, (May 2006).
- Program Committee Member, The 3<sup>rd</sup> ACIS International Conference on Software Engineering Research, Management, and Applications, (August 2005).
- Session Chair, 8<sup>th</sup> IASTED International Conference on Software Engineering and Applications, (November 2004).
- Member of the Press Team, The 23<sup>rd</sup> International Conference on Software Engineering, (May 2003).
- Member of the Press Team, The 22<sup>nd</sup> International Conference on Software Engineering, (May 2002).

### Community Service

- Faculty Advisor, Pendleton High School Computer Science Unplugged Outreach Program, (September 2009 – present).
- Judge, Pendleton Elementary Science Fair, (December 2005).
- Judge, Pendleton Elementary Science Fair, (December 2004).

### Professional Development

- Microsoft Corporation, Microsoft Academic Days on Windows and Embedded Computing at Arizona State University, Tempe, AZ, (March 2007).
- University of Hawaii, NSF EPSCoR, Cyberinfrastructure for Integrated Earth Observing Systems (NSF EPSCoR Workshop), Honolulu, HI, (November 2006).
- Microsoft Corporation, Microsoft Windows CE 5.0 Train the Trainer Course, Redmond, WA, (October 2004).

*Last updated September 20<sup>th</sup>, 2009.*