

## Curriculum Vita

**Nicholas S. Flann**  
**Associate Department Head**  
**Department of Computer Science**  
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### Education:

Ph.D., Computer Science, Oregon State University, 1992, under Professor T. G. Dietterich.

Title of dissertation: ``Correct Abstraction in Counter-planning: A Knowledge Compilation Approach."''

M.S., Computer Science, Oregon State University, 1986, under Professor T. G. Dietterich.

Title of thesis: ``Learning Functional Descriptions From Examples."''

B.S., Electrical and Electronic Engineering, (with first class honors), Coventry Polytechnic, England, 1982, under Professor P. Taberner. Title of thesis: ``Speech Recognition and Analysis."''

### Research Interests:

Computational modeling of integrated multi-cellular systems with particular interest in:

- Understanding the emergence of complex structures through local-only computation of cells and sub-cellular mechanisms
- Application in 2D/3D tissue development during angiogenesis with an emphasis on
  - understanding interactions between the spatial structure of the stroma and the growing endothelial cells
  - modeling the regulatory control of cell differentiation and its effect on the regularity and effectiveness of the resulting vessel network
- Applying massively parallel machine intelligence search-based methods to
  - validate and build computational models using live-cell imaging and protein expression data
  - discover novel potential therapies through perturbation analysis and multi-criteria optimization
- High-performance graphics-based models of tissue development based on the stochastic Potts model with extensions that capture physical cytoskeleton structures (such as filopodia and adherens junctions)
- Role of criticality in the dynamics of multi-scale systems.

## Teaching Specialties:

**Introductory and Advanced Bioinformatics.** Courses include bioinformatics I and II, bioinformatics problems and solutions and bioinformatics research. Basic biology is covered along with advanced algorithms over strings, sequences and trees; databases and networking; search engines; data mining; modeling and simulation; and models of collaboration. Courses cover both practical skills in extracting and using data from existing databases and research in advanced modeling of biological systems and development of new algorithms.

**Introductory and Advanced Artificial Intelligence for undergraduate and graduate students.** Courses include expert systems, genetic algorithms, neural networks, robotics, machine learning, general artificial intelligence, learning and problem solving. Practical applications of new methods and technology are emphasized, with students completing projects such as controlling a simulated robot, an expert system, an intelligent interface using speech or handwriting recognition, or a scheduling or planning system using genetic algorithms.

**Algorithms and Data Structures for undergraduate and graduate students.** Courses include beginning data structures and programming and introduction to advanced algorithm design and analysis. Principles and practices are emphasized, with students learning how to design efficient algorithms for novel problems, deriving the expected complexity of algorithms then implementing and carefully evaluating their empirical behavior.

## Classes Taught:

CS Introductory Class: Introduction to Computer Science II, Introduction to Computer Science III

Math Introductory Class: Discrete Mathematics (for Computer Science BS students)

CS BS Senior/Graduate Classes: Operating Systems, Programming Languages, Expert Systems, Advanced Algorithms, Introduction to Artificial Intelligence, Applied Robotics (Special Topics), Bioinformatics I, Bioinformatics II, Bioinformatics Problems and Solutions.

CS Advanced Graduate Classes: Advanced Artificial Intelligence, Neural Networks, Genetic Algorithms, Reinforcement Learning, Bio-Inspired Artificial Intelligence, Planning and Intelligent Autonomous Behavior, Bioinformatics II, Artificial Life, and Bioinformatics Research, and Multi-cellular development systems.

## Academic Experience:

2011 Associate Department Head, Computer Science Department, USU

2010 Affiliated Faculty, Institute for Systems Biology, Washington

2010 Visiting Research Scientist, Institute for Systems Biology, Seattle, Washington

2002 Visiting Faculty, Computer Science Department, Southern Oregon University

1997--present: Associate Professor, Department of Computer Science, Utah State University.  
1991--1997: Assistant Professor, Department of Computer Science, Utah State University.  
1985--1991: Research Assistant, Department of Computer Science, Oregon State University.  
1983--1985: Teaching Assistant, Department of Computer Science, Oregon State University.

### **US Patents Awarded:**

Number 7,228,214	Path planner and method for planning a path plan having a spiral component
Number 7,216,033	Path planner and method for planning a contour path of a vehicle
Number 7,110,881	Modular path planner
Number 7,079,943	Point-to-point path planning
Number 7,010,425	Path planner and a method for planning a path of a work vehicle
Number 6,934,615	Method and system for determining an efficient vehicle path
Number 6,907,336	Method and system for efficiently traversing an area with a work vehicle

### **Business Experience:**

1982 -- 1983: Electronic Engineer, British Aerospace Dynamics, Space Division, England.  
1978 -- 1982: Engineering apprentice, British Aerospace Dynamics, England.  
1995 -- 2008: Intelligent systems consultant for United States Air Force project.  
1999: Co-founder and co-owner of Autonomous Solutions  
1999 -- 2008: Autonomous vehicle planning and intelligent behaviors consultant for  
AutonomousSolutions.com  
2000 -- present: Expert witness for internet related criminal proceedings

### **Professional Activities:**

Associate Editor for BioSystems Journal since 2008  
Reviewer for International Joint Conference on Artificial Intelligence IJCAI 2011  
Session Chair for the Computational Systems Biology Conference, WCSB 2010  
Reviewer for BMC Systems Biology Journal, since 2007  
Reviewer for 2009 IEEE International Conference on Robotics and Automation  
Reviewer for IEEE Transactions on Parallel and Distributed Systems, since 2001  
Reviewer for Journal of Theoretical Biology, since 2006  
Reviewer for 2008 IEEE International Conference on Robotics and Automation  
Reviewer for Symposium on Risk Management and Cyber-Informatics: RMCi 2008  
Local Arrangements Chair, First Human Robot Interaction Conference, SLC, 2006  
Session Chair and Program Committee Member for 1<sup>st</sup> I IFAC conference on Teleomatics  
Applications in Automation and Robotics, July 2001  
Program Committee Member and Session Chair for SPIE Conference on Unmanned Ground  
Vehicles Technology, Orlando, Florida, April 2001  
Program Committee Member and Session Chair for SPIE Conference on Unmanned Ground  
Vehicles Technology, Orlando, Florida, April 2000

Program Committee Member and Session Chair for SPIE Conference on Unmanned Ground Vehicles Technology, Orlando, Florida, April 1999  
Program Committee for the 1998 SPIE Robotic and Semi-Robotic Ground Vehicle Technology Conference  
Program Committee for the 1997 International Joint Conference on Artificial Intelligence  
Program Committee for the 1997 Second Genetic Programming Conference  
Reviewer for Journal of Intelligent and Fuzzy Systems  
Program Committee for the 1996 National Conference on Artificial Intelligence  
Program Committee for the 1996 International Conference on Machine Learning in Bari (Italy)  
Reviewer for International Journal in Computer Simulation  
Reviewer for 1995 International Conference on Parallel Processing  
Reviewer for 1995 Computational Learning Theory Conference  
Reviewer for the Journal of Artificial Intelligence Research  
Reviewer for Computational Intelligence  
Reviewer for the 1994 Transputer Research And Applications Conference  
Reviewer for book: Grammatical Inference: Theory, Applications and Alternatives  
Committee member for Workshop on Speedup Learning and Knowledge Compilation at 1993 Machine Learning Conference  
Submissions Chair for the American Association for Artificial Intelligence 1993 Fall Symposium on Games: Planning and Learning  
Committee member for Workshop on Speedup Learning and Knowledge Compilation at 1992 Machine Learning Conference  
Reviewer for Artificial Intelligence Journal (Since 1992)  
Reviewer for National Science Foundation Information Sciences Program (since 1986)  
Reviewer for Canadian Artificial Intelligence Association (since 1987)  
Reviewer for Institute of Electrical and Electronic Engineer Transactions (since 1990)  
Reviewer for Institute of Electrical and Electronic Engineer Software (since 1988)  
Reviewer for Machine Learning Journal (since 1988)

## **Memberships:**

International Society for Optical Engineering (since 1997)  
Association for Computing Machinery (since 1983)  
American Association of Artificial Intelligence (since 1984)  
Institute of Electrical and Electronic Engineers (since 1993)  
Pattern Recognition Society (since 1993)

## **Grants under Review:**

Ilya Shmulevich (co-PI), Nicholas Flann, (co-PI) and Wei Zhang (co-PI), BRP R01 PAR-10-234, Oct 2010, *Multi-scale Multi-systems Modeling of Glioma*. Amount requested for five years \$4,800,00 total direct for three labs.

Aimee Dudley (PI), Nicholas Flann (co-PI), and Ilya Shmulevich (co-PI), component of NIH Systems Biology Center Grant, Oct 2010, *Multiscale RNA Expression Patterns and their*

*Role in Fluffy Yeast Colony Formation.* Amount requested \$2,500,00 total direct for 2 labs.

### **Grants in Preparation:**

Aimee Dudley (co-PI), Nicholas Flann (co-PI), and Ilya Shmulevich (co-PI), NIH RO1 Oct 2011, Understanding Fluffy Yeast Colony Formation: A multi-scale data-driven approach. Amount requested for three years \$900,000 total direct for three labs.

### **Grants and Contracts Received:**

Nicholas Flann (PI), *Multiscale Spatial and Temporal Dynamics of Yeast Colony Development: Integrating Measurement and Modelling.* Awarded by Luxembourg Centre for Systems Biomedicine and the University of Luxembourg, April 2011. Amount \$113,000.

Simon Kahan (P.I), Nicholas Flann, and Ilya Shmulevich, *High Performance 3D Cell Modeling: Applications in Angiogenesis and Skin* LDRD grant, Department of Energy. Amount \$50,000.

Nicholas Flann (P. I). Discovering Initiator Cells in Immunity and Cancer from Live-cell Microscopic Images: A Model-Based Approach, Utah State University Research Catalyst Program, June 2010, Amount \$20,000.

Nicholas Flann (P.I). Addition to Automatic Piece Packing, Funded by National Engineering and Environmental Laboratory, Idaho Falls, June 2000 – December 2001. Amount \$53,000.

Kevin Moore (P.I), Nicholas Flann, and Carl Wood. Modification 03 to Agreement DAAE07-98-3-0023, TACOM Lightweight Robotic and Semi-autonomous Ground Vehicle Mobility and Survivability Enhancements Program, June 2000, Amount \$1,800,000.

Kevin Moore (P.I), Nicholas Flann, and Carl Wood. Modification 02 to Agreement DAAE07-98-3-0023, TACOM Lightweight Robotic and Semi-autonomous Ground Vehicle Mobility and Survivability Enhancements Program, June 1999, Amount \$2,200,000.

Nicholas Flann (P.I), Funded by National Engineering and Environmental Laboratory Automatic Piece Packing, Idaho Falls, April-October 1999, Amount \$28,000.

Dan Watson (P.I.), Nicholas Flann & Scott Cannon. Generational Scheduling Environment for Autonomous Negotiating Teams, Funded by DARPA, January 1999, Amount \$167,000.

Kevin L. Moore (P.I), Nick Flann and Carl Wood. Obstacle Detection and Avoidance for an Automated Tractor, Funded by John Deere Co. Nov 15, 1998 to August 31, 1999, Amount \$384,884.

Kevin Moore (P.I) and Nicholas Flann. 5510N Autonomous Orchard Project, , Funded by John Deere, October 1999, Amount \$330,000.

Kevin Moore (P. I), Nicholas Flann, Cindy Furse and Randy Haupt. TACOM Safety Project, Funded by TACOM, February 2000, Amount \$117,700.

Bishop, B. (P. I.), Gunderson, R., Flann, N. S., & Abbott, B.(1998). DAAE07-98-Q-BAA1: Lightweight Robotic and Semiautonomous Ground Vehicle Mobility and Survivability Enhancements. TACOM (Army Tank Command). Duration 1 year; Total amount: \$2,489,520.

Flann, N. S. (P. I.) (1997). Real-time Computer Controlled Optimal Harvest Coordination. Case International Corporation. Duration 1 year; Total amount \$45,000.

Hansen, W., (P. I), Steadman, B. L., & Flann, N. S. (1998). Statistical Control Process Applications to Test Failure Information. United States Air Force, AF98-262. Duration 1 year; Total amount: \$100,000.

Gunderson, R. W. (P. I.), Flann N. S., Abbott B., Anderson M, & M. McKay. (1997). Multiple Cooperating Robotic Vehicles for the U. S. Army. US Army Artificial Intelligence Center. Duration 2 year; Total amount: \$150,000.

Gunderson, R. W. (P. I) & Flann N. S. (1995). Intelligent Fully Autonomous Micro-Robotic Control Systems for Hazardous Waste Site Characterization, Department of Energy & Massachusetts Institute of Technology Research Consortium. Duration: 3years, Total amount: \$600,000.

Roberts D. W. (P. I.), Falconer A. & Flann N. S. (1994). Shoshone National Forest Ecological Survey Project, Shoshone National Forest Research Division. Duration: 3years; Total amount: \$300,000.

Flann N. S. (P. I.) (1993). Technical Service Support for COTS Risk Management IR&D Project No. 93268718, TRW Ballistic Missiles Division, Duration: 1year; Total amount: \$5,300.

Flann N. S. (P. I.) (1993). On-line Cursive Handwriting Recognition using Time-delayed Neural Networks, USU Faculty Grant, Duration: 1year; Total amount: \$15,000.

Flann N. S. (P. I.), Zhang J., Cheng H., & Althouse B. (1992). A Cost Effective Machine Intelligence Laboratory, National Science Foundation, Instrumentation and Laboratory Improvement Program, Duration: 3years; Total amount: \$113,636.

Flann N. S. (P. I.) (1992). Improving Extensional Programming through Smooth Encodings, USU Faculty Grant, Duration 1year; Total amount: \$15,000.

### **Administrative Service:**

Faculty Senate,  
Committee on Committees (Faculty Senate),  
College of Science Awards committee,  
Department awards committee, search committee, tenure committees.  
Chair of Daniel Bryce's tenure committee  
Chair of the Department's curriculum assessment committee  
Ombudsperson for College tenure committees.  
Science and Engineering Recruitment Team (part of the NSF Advance Grant).  
College of Science Currie Grant review committee  
Department Graduate Advisor  
College of Science Graduation Committee  
University Genome Task Force

### **Student Mentoring:**

Over 60 Master of Science Thesis and Projects supervised.

### **Refereed Journal Publications:**

Mahoney, A. W., Podgorski, G., Flann, N, (2010) **A Multi-Objective Optimization Based-Approach for Discovering Novel Cancer Therapies**, IEEE/ACM Transactions on Computational Biology and Bioinformatics, 07 May. 2010. IEEE Computer Society, <<http://doi.ieeecomputersociety.org/10.1109/TCBB.2010.39>>

Podgorski, G., Bansal, M, Flann, N, (2007). **Regular Mosaic Pattern Formation: A Study of the Interplay between Lateral Inhibition, Apoptosis, and Differential Adhesion**. In *Journal of Theoretical Biology and Medical Modelling*, 2007, Volume 4:43

Flann N. S., Moore K. L., Ma L. (2002) **A Small Mobile Robot for Security and Inspection Operations**, *Control Engineering Practice* Volume 10, 2002, 1265-1270.

Dinerstein, J. Egbert L. and Flann N. S. (2001) **Linear Grouping: A Method for Optimizing 3D Vertex Transformation**. In *Journal of Graphics Tools*, July 2001, Published by the ACM.

Gunderson, R. W., Torrie M. W., Flann N. S., Neale C.M.U. and Baker D. J. (2000) **The Collective: GIS and the Computer-Controlled Farm**. In *Geospatial Solutions*, October 2000.

Moore K. L., and Flann N. S. (2000). **A Six-Wheeled Omnidirectional Autonomous Mobile Robot**. In *IEEE Control Systems Magazine*. Dec. 2000.

- Chen H, Flann N. S. and Watson D. W. (1997). **Parallel Genetic Simulated Annealing: A Massively Parallel SIMD Algorithm**. In IEEE Transactions on Parallel and Distributed Systems.
- Dietterich T. G. and Flann N. S. (1997). **Explanation-based Learning and Reinforcement Learning: A Unified View**. In Machine Learning 1-44.
- Flann N. S. and Dietterich T. G. (1989). **A Study of Explanation-based Methods for Inductive Learning**. In Machine Learning 4, (1) 187-226.
- Hall R. P., Falkenhainer B., Flann N. S., Hampson S., Reinke R., Shrager J., Sims M. and Tadepalli P. (1987). **A Review of the Fourth International Workshop on Machine Learning**. In Machine Learning, 2 (2) 173-190.
- Dietterich T. G., Flann N. S. and Wilkins D. (1986). **A Summary of Machine Learning Papers from the International Joint Conference on Artificial Intelligence 1985**. In Machine Learning, 1 (2) 227-242.

### **Refereed Conference Publications:**

- Hayrapetyan1 N., Ruusuvoori P., Shmulevich I., Blake N., Ozinsky A., Flann N. S. (2011). **Correcting Cell Tracking Errors using Adaptive Re-segmentation and Coupled Flow** In Eighth International Workshop on Computational Systems Biology June. 2011. Zurich, Switzerland. (peer reviewed conference)
- Ghaffarizadeh A., Ahmadi K., and Flann N. S. (2011). **Sorting Unsigned Permutations by Reversals using Multi-Objective Evolutionary Algorithms with Variable Size Individuals**. In IEEE Congress on Evolutionary Computation June. 2011. New Orleans, USA. (peer reviewed conference)
- Mahoney A. W., Smith B. G., Flann N. S., and Podgorski G. J., (2008). **Discovering Novel Cancer Therapies: A Computational Modeling and Search Approach**. In *IEEE Conference on Computational Intelligence in Bioinformatics and Bioengineering*, 2008 (peer reviewed conference)
- Mahoney A. W., Smith B. G., Flann N. S., and Podgorski G. J., (2008). **Discovering Novel Cancer Therapies: A Computational Modeling and Search Approach**. In *IEEE Conference on Computational Intelligence in Bioinformatics and Bioengineering*, 2008 (peer reviewed conference)
- Flann N. S., Mahoney A. W., Smith B. G. and Podgorski G. J., (2008). **Evaluating Cancer Interventions by Simulating Tumor-Induced Angiogenesis, Blood Flow and Oxygen Delivery**. In *European Conference on Mathematical and Theoretical Biology*, 2008 (peer reviewed conference)

- Winward G. and Flann N. S. (2007). **Coordination of Multiple Vehicles for Area Coverage Tasks** In the proceedings of the *IEEE/RSJ 2007 International Conference on Intelligent Robotics and Systems (IROS 2007)*. (Peer reviewed conference)
- Dhanasekaran, R., Podgorski, G. & Flann, N. (2007). **Co-option and Irreducibility in Regulatory Networks for Cellular Pattern Development**. In *Proceedings of First IEEE Symposium on Artificial Life 2007*, Honolulu, Hawaii. (Peer reviewed conference)
- Kim, Y., Flann, N., Xu, B., Wei, Q., & Ko, Y. (2007). **MathGirls: Virtual peers as change agents to improve girls' math self-efficacy and math attitudes**. *The Annual Conference of American Educational Research Association (AERA)*: Chicago, IL. (Peer reviewed conference)
- Kim, Y., Flann, N., Wei, Q., Ko, Y. & Alla, S. (2006). **MathGirls: Motivating Girls to Learn Math through Pedagogical Agents**. In P. Kommers & G. Richards (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2006* (pp. 2025-2032). Chesapeake, VA: AACE (Peer reviewed conference)
- Flann N. S., Hu J., Bansal M., Patel V. and Podgorski G. (2005). **Biological Development of Cell Patterns: Characterizing the Space of Cell Chemistry Genetic Regulatory Networks**, *Eighth European Conference on Artificial Life*, Canterbury, Kent, UK, September 2005.
- Lewis P. J., Flann N. S., Torrie M. R., Poulson E. A., Petroff T., and Witus G., (2005). **Chaos an Intelligent Ultra-Mobile SUGV: Combining the Mobility of Wheels, Tracks, and Legs**, *SPIE Conference on Unmanned Ground Vehicle Technology VI, Defense and Security Symposium.* , Orlando, FL, April 2005.
- Flann N. S., Smith, B. and Klinger K. (2004). **Integrated real-time perception and navigation in cluttered environments**, *SPIE Conference on Unmanned Ground Vehicle Technology VI, Defense and Security Symposium.* , Orlando, FL, April 2004
- Flann N. S., Adamczek, P. and Widus, G. (2004). **Intelligent behaviors development through virtual prototyping**, *SPIE Conference on Unmanned Ground Vehicle Technology VI, Defense and Security Symposium.* , Orlando, FL, April 2004
- Shah, H., Bahl V., Flann, N. S., and Moore, K. L. (2003). **Intelligent Resource Scheduling for Autonomous Vehicle Teams**, *Conference on Unmanned Robotic Vehicles*, Orlando, FL, April 2003
- Berk, K, Howell, C., Wille K., and N. S. Flann, N. S. (2003). **Semi-automatic Development of Test Program Sets (TPS)**, *IEEE AutoTestCon 2003*, Los Angeles, CA, September 2003.

- Shah, H., Bahl V., Martin J., Flann, N. S., and Moore, K. L. (2002). **Intelligent behavior generator for autonomous mobile robots using planning-based AI decision making and supervisory control logic**, *Conference on Unmanned Robotic Vehicles*, Orlando, FL, April 2002
- Flann, N. S., Davidson, M., Martin, J., and Moore, K. L. (2001). **Intelligent Behavior Generation Strategy for Autonomous Vehicles using a Grammar-Based Approach**, in the International Conference on Field and Service Robotics (FSR 2001), Helsinki University of Technology, Finland, June 2001.
- Flann, N. S., Moore, K. L., and Lili, M. (2001). **A Small Mobile Robot for Security and Inspection Operations**, in 1<sup>st</sup> I IFAC conference on Teleomatics Applications in Automation and Robotics, July 2001.
- Flann, N. S., Gunderson, R. W., Moore K., and Wood C. (2000). **Intelligent Mobility through Omni-Directional Vehicles: A Research Program**, in SPIE Conference on Unmanned Ground Vehicles Technology, Orlando, Florida, April 2000, SPIE Vol. 4320
- Gunderson, R. W., Torrie M, Flann, N. S. and Neale C. (2000). **Application of Geo-spatial Information Technology to Computer Controlled Farm Systems**. in proceedings of the Second International Conference on Geo-spatial Information in Agriculture and Forestry, Lake Buena Vista, Florida, Jan 2000.
- Goodsell, T. and Flann, N. S. (1999). **Planning for Omni-Directional Vehicles in Structured Terrains**, in SPIE Conference on Unmanned Ground Vehicles Technology, Orlando, Florida, April 1999. SPIE Vol. 3693.
- Moore, K. and Flann, N. S. (1999). **Hierarchical Task Decomposition Approach to Path Planning and Control for an Omni-Directional Autonomous Mobile Robot**, in the Proceedings of the 1999 IEEE International Symposium on Intelligent Control, Intelligent Systems and Semiotics, Cambridge, MA, September, 1999.
- Goodsell, T. and Flann, N. S. (1999). **Planning for Omni-Directional Vehicles in Natural Terrains**, in SPIE Conference on Mobil Robots XIV, Boston, Massachusetts, Sept 1999. SPIE Vol. 3838.
- Goodsell, T. and Flann, N. S. (1999). **Mobility Planning for Omni-Directional Vehicles**, in **Proceedings of the IASTED International Conference**, Robotics and Applications, Santa Barbara, Ca, Oct 1999.
- Saunders K. and Flann N. S. (1999). **Area Coverage Planning with Dynamic Obstacle Avoidance for Autonomous Vehicles**, in Proceedings of the IASTED International Conference, Robotics and Applications, Santa Barbara, Ca, Oct 1999.

- Flann, N. S. & Pells L. (1998). **Mission Planning and Execution for Cooperative Autonomous Robotic Vehicles.** In the SPIE Conference on Robotic and Semi Robotic Vehicles.
- Tao M., Elssamadisy A., Flann N. S. & Abbott B. (1997). **Optimal Route Re-planning for Mobile Robots: A Massively Parallel Incremental A\* Algorithm.** in IEEE International Conference on Robotics and Automaton, Albuquerque, NM.
- Abbott B. & Flann N. (1997). **Advanced Rover Chassis III: An Intelligent Autonomous Robot.** in The 1997 International Conference on Mobile Planetary Robots & Rover Roundup, Santa Monica, CA.
- Hooper D. & Flann N. S. (1997). **Recombinative Hill-Climbing: An Improved Search Method for Genetic Programming,** in Genetic Programming 1997: Proceedings of the Second Annual Conference, Stanford University, CA.
- Hooper D. & Flann N. S. (1996). **Improving the Accuracy and Robustness of Genetic Programming through Expression Simplification.** In Koza, John R., Goldberg, David E., Fogel, David B., and Riolo, Rick L. (editors). 1996. Genetic Programming 1996: Proceedings of the First Annual Conference, July 28-31, 1996, Stanford University. Cambridge, MA: The MIT Press. Pages 428--429.
- Ranjit A. Henry, Flann N. S. & Watson D. W. (1996). **A Massively Parallel SIMD Algorithm for Combinatorial Optimization.** In 1996 International Conference on Parallel Processing Technical Program on Algorithms and Applications.
- Dietterich T. G. and Flann N. S. (1995). **Explanation-based Learning and Reinforcement Learning: A Unified View.** In International Machine Learning Conference, 1995.
- O'Neill M. R. Allan, V. H., Flann N. S. & Chen H. (1995). **Petri Net Representation for Parallel Loop Scheduling Using a Genetic Algorithm.** In Fourteenth Workshop of the UK Planning and Scheduling Special Interest Group, Ed. S. Steel, UK.
- Flann N. S., Foley B. E. & Rude R. (1995). **A Computer-based Intelligent Assistant for Assessment of Articulation Disorders.** In the Tenth International Conference on Technology and Persons with Disabilities, Los Angeles, CA, June 1995.
- Flann N. S., Taber J. & Grenney W. J. (1995). **Optimizing Roadway Design for Congestion Management: A Simulated Annealing Approach.** In the Second Congress on Computing in Civil Engineering, American Society of Civil Engineers, June 1995.
- Chen H. & Flann N. S. (1994). **Parallel Simulated Annealing and Genetic Algorithms: A Space of Hybrids Methods.** In The Third Parallel Problem Solving from Nature Conference, Jerusalem, 1994.

- Flann N. S., Foley B. E., Rude R. & Meifang Hu (1994). **Automated Knowledge-Based Assessment of Dysarthric Speech**. In International Conference on Augmentative and Alternative Communication, Amsterdam, The Netherlands.
- Flann N. S. (1993) **Time-delayed Neural Networks Applied to On-line Cursive Handwriting Recognition: An Investigation**. In the Proceedings of the British Neural Network Society Symposium on Recent Advances in Neural Networks 1993.
- Flann N. S. (1993) **Integrating Recognition and Segmentation in On-line Cursive Handwriting Using Error-correcting Grammars**. In the Proceedings of the First Conference on Grammatical Inference: Theory, Applications and Alternatives Essex, UK.
- Flann N. S. & Shekhar S. (1993). **Recognizing On-line Cursive Handwriting Using a Mixture of Cooperating Pyramid-style Neural Networks**. In the Proceedings of the World Conference on Neural Networks Portland, OR.
- Flann N. S. & Meifang Hu (1993). **Improving Spoken Communication for Dysarthric Individuals Using Voice Analysis and Synthesis**. In the Proceedings of the Sixteenth Annual RESNA Conference, Las Vegas, NV.
- Flann N. S. (1990). **Applying Abstraction and Simplification to Learn in Intractable Domains**. In the Proceedings of the Seventh International Machine Learning Conference (pp. 277-285). Austin, TX: Morgan Kaufmann.
- Koff C. N., Flann N. S. and Dietterich T. G. (1988). **An Efficient ATMS for Equivalence Relations**. In the Proceedings of the Seventh National Conference on Artificial Intelligence (pp. 182-187). Saint Paul, MN:Morgan Kaufmann.
- Flann N. S., Dietterich T. G. and Corpron D. (1987). **Forward Chaining Logic Programming with the ATMS**. In the Proceedings of the Sixth National Conference on Artificial Intelligence (pp. 24-29). Seattle, WA: Morgan Kaufmann.
- Flann N. S. and Dietterich T. G. (1986). **Selecting Appropriate Representations for Learning from Examples**. In the Proceedings of the Fifth National Conference on Artificial Intelligence (pp. 460-466). Philadelphia, PA: Morgan Kaufmann.

### **Refereed Book Chapters:**

- Sasaki, Y., N. S. Flann, and P.W. Box. (2005). **The Multi-agent games by Reinforcement Learning Applied to on-line Optimization of Traffic Policy**. In Computational Economics: A Perspective from Computational Intelligence, Morgan Kaufmann Publishers, Chen S. H. (Ed).

- Flann N. S. (1994) **Integrating Recognition and Segmentation in On-line Cursive Handwriting Using Error-correcting Grammars**. In Grammatical Inference: Theory, Applications and Alternatives, Simon Lucas, (Ed.).
- Chen H. & Flann N. S. (1994). **Parallel Simulated Annealing and Genetic Algorithms: A Space of Hybrids Methods**. Reprinted in Lecture Notes in Computer Science, 886, Yuval Davidor, Hans-Paul Schwefel & Reinhard Manner (Eds). Springer-Verla.
- Flann N. S. and Dietterich T. G. (1989). **A Study of Explanation-based Methods for Inductive Learning**. Reprinted in Readings in Machine Learning, Jude Shavlik and Thomas Dietterich, (eds), San Mateo, CA: Morgan Kaufmann.
- Flann N. S. (1989). **Improving Search Based Artificial Intelligence Systems via Explanation Based Reformulation**. In Change of Representation and Inductive Bias, D. Paul Benjamin, (Ed.), Norwell, MA:Kluwer Academic.

### **Refereed Workshop Publications:**

- Saski, Y., and Flann, N. S. (2003) **Multi-Agent Reinforcement Learning for Traffic Policy** The Third International Workshop on Computational Intelligence in Economics and Finance, North Carolina, USA, September 26-30th, 2003.
- Shroff P., Flann N. S. and Watson D. (1996). **Scheduling Data-dependent Tasks in Heterogeneous Environments: A Genetic Simulated Annealing Approach**. In the Heterogeneous Computing Workshop, (HCW `96), Sponsored by the IEEE Technical Committee on Parallel Processing, Honolulu, HI, pp. 98-104.
- Roberts, D and Flann N. S., (1995). **Optimizing Information Gain for Ecological Surveys**. In the Large Scale Mapping and Vegetation Classification Workshop, IAVS, Houston, TX.
- Flann N. S. and Aha D. W., (1995). **Designing Error Correcting Codes for Learning in Context**. In the Machines that Learn Workshop, Snowbird, UT.
- Aha D. W., Flann N. S. and Banklert R. L. (1994). **Using Error Correcting Coding Schemes to Distinguish Cloud Types**. Artificial Intelligence and Environmental Sciences Workshop, San Diego, CA.
- Flann N. S., Shekhar S., Suresh K. and Balaji A. (1993). **Time Delayed Neural Networks Applied to On-line Cursive Handwriting Recognition: An Investigation**. In

Proceedings of the British Neural Network Society Symposium on Recent Advances in Neural Networks, Birmingham, UK.

Flann N. S. (1992). **Knowledge Compilation in Counter-planning Using Abstract Reverse Enumeration.** In the Proceedings of the Second Knowledge Compilation and Speedup Learning Workshop, Aberdeen, Scotland.

Flann N. S. (1990). **Exploiting a Second Order Theory of Influence to Learn in Intractable Domains.** In the Proceedings of the Change of Representation Workshop, Menlo Park, CA.

Flann N. S. (1989). **Learning Appropriate Abstractions for Planning in Formation Problems.** In the Proceedings of the Sixth International Workshop on Machine Learning (pp. 235-239), Ithaca, NY: Morgan Kaufmann.

Flann N. S. (1988). **Improving Problem Solving Performance by Example Guided Reformulation of Knowledge.** In the Proceeding of the International Workshop on Change of Representation and Inductive Bias (pp 14-28), Briarcliff, NY.

Dietterich T. G. and Flann N. S. (1988). **An Inductive Approach to Solving the Imperfect Theory Problem.** In the Proceeding of the American Association of Artificial Intelligence Spring Symposium on Explanation Based Learning (pp. 42-46), Palo Alto, CA.

Flann N. S. and Dietterich T. G. (1985). **Exploiting Functional Vocabularies to Learn Structural Descriptions.** In the Proceeding of the Third International Machine Learning Workshop (pp. 41-43), Skytop, PA.

## Invited Talks:

*Building and Simulating Multiscale Models in Systems Biology: A High Performance Computing Approach*, presented to Signal Processing Group, Tampere University of Technology, Finland, June 2010

*Building and Simulating Multiscale Models in Systems Biology: A High Performance Computing Approach*, presented to High Performance Computing and Systems Biology Groups at the Pacific Northwest National Laboratory, May 2010

*Discovering Novel Cancer Therapies: A Computational Modeling and Search Approach*, presented at the IEEE conference on Computational Intelligence in Bioinformatics and Bioengineering, September 2008.

*Evaluating Cancer Interventions by Simulating Tumor-Induced Angiogenesis, Blood Flow and Oxygen Delivery*, presented at the European Conference on Mathematical and Theoretical Biology, July 2008.

***An Introduction to Unmanned Systems (Tutorial)***, presented at the SPIE Defense and Security Symposium. Orlando, Fl., April 2008.

***Co-option and Irreducibility in Regulatory Networks for Cellular Pattern Development***, presented at the First IEEE Symposium on Artificial Life 2007, Honolulu, Hawaii. April 2007.

***Using a Web-based Application to Improve Assessment***, presented at the 2007 Best Assessment Processes IX Symposium, Indianapolis, IN., April 2007.

***An Introduction to Unmanned Systems (Tutorial)***, presented at the SPIE Defense and Security Symposium. Orlando, Fl., April 2007.

***Biological Development of Cell Patterns: Characterizing the Space of Cell Chemistry Genetic Regulatory Networks***, presented at the Eighth European Conference on Artificial Life, Canterbury, Kent, UK, September 2005.

***Computational Modeling Studies of Development***, presented at Oregon State University Bioinformatics Seminar Series, May 2005.

***Adaptive Optimal Rover Path Planning: A Delayed Commitment Approach***, presented at SWIM Mars Experiments and Rover Technologies Workshop, San Antonio, Texas, USA. August 2002.

***Our Future with Intelligent Autonomous Vehicles: from Mowing Lawns to Clearing Mine Fields***, presented at Science Seminar at Southern Oregon University, May 2002.

***A Small Mobile Robot for Security and Inspection Operations***, presented at 1<sup>st</sup> I IFAC conference on Teleomatics Applications in Automation and Robotics, Weingarten, Germany. July 2001.

***Intelligent Mobility through Omni-Directional Vehicles: A Research Program***, presented at SPIE Conference on Unmanned Ground Vehicles Technology, Orlando, Florida, April 2000.

***Optimal Two Dimensional Bin Packing with Applications to Waste Processing***, presented at Brigham Young University Computer Science Colloquium, Jan 2000.

***Object-Orientated Terrain Modeling for Intelligent Path Planning***, presented at Brigham Young University Computer Science Colloquium, Jan 2000.

***Area Coverage Planning with Dynamic Obstacle Avoidance for Autonomous Vehicles***, at IASTED, October, 1999, Santa Barbara, CA.

- Optimal Route Re-planning for Mobile Robots: A Massively Parallel Incremental A\* Algorithm*** presented at IEEE International Conference on Robotics and Automaton, Albuquerque, NM, April 1997.
- Advanced Rover Chassis III: An Intelligent Autonomous Robotic System***, presented at the 1997 International Conference on Mobile Planetary Robots & Rover Roundup, Santa Monica, CA, January 1997.
- Petri Net Representation for Parallel Loop Scheduling Using a Genetic Algorithm***, presented at the Fourteenth Workshop of the UK Planning and Scheduling Special Interest Group, Essex, UK, November 1995.
- Explanation-based Learning and Reinforcement Learning: A Unified View*** presented at the Computer Science Colloquium at Brigham Young University, UT, March 1995.
- Parallel Simulated Annealing and Genetic Algorithms: A Space of Hybrid Methods*** presented at the Third Parallel Problem Solving from Nature Conference, Jerusalem, October 1994.
- Applied Artificial Intelligence Research at Utah State University*** presented at the Air Force Group Meeting on Artificial Intelligence, Hill Air Force Base, Ogden, UT, May 1994.
- A Hybrid On-line Handwriting Recognition System***, presented at the Software Technologies Symposium, U. S. Air Force, Salt Lake City, UT, June 1994.
- Computer Recognition of On-line Cursive Writing: Progress and Challenges***, presented at the University of Utah Neural Networks Research Group and the VA GRECC, Salt Lake City, UT, 1993.
- Recognizing On-line Cursive Handwriting Using a Mixture of Cooperating Pyramid-style Neural Networks***, presented at the World Congress on Neural Networks, Portland, OR, July 1993.
- Improving Spoken Communication for Dysarthric Individuals Using Voice Analysis and Synthesis***, presented at the Sixteenth Annual RESNA Conference, Las Vegas, NV, June 1993.
- Integrating Recognition and Segmentation in On-line Cursive Handwriting using Error-correcting Grammars***, presented at the First Conference on Grammatical Inference: Theory, Applications and Alternatives, Essex, UK, June 1993.
- Knowledge Compilation in Counter-planning Using Abstract Reverse Enumeration***, presented at the Knowledge Compilation and Speedup Learning Workshop, Aberdeen, Scotland, July 1992.

*Applying Abstraction and Simplification to Learn in Intractable Domains*, presented at the Seventh International Conference on Machine Learning, University of Texas at Austin, TX, June 1990.

*Exploiting a Second Order Theory of Influence to Learn in Intractable Domains*, presented at the Change of Representation Workshop, Menlo Park, CA, March 1990.

*Compiling Search into Recognition*, presented at the Symposium on Computational Approaches to Concept Formation, Stanford University, CA, January 1990.

*Learning Appropriate Abstractions for Planning in Formation Problems*, presented at the Sixth International Workshop on Machine Learning, Cornell University, Ithaca, NY, June 1989.

*Improving Problem Solving Performance by Example Guided Reformulation of Knowledge*, presented at the International Workshop on Change of Representation and Inductive Bias, Briarcliff, NY, June 1988.

*Forward Chaining Logic Programming with the ATMS*, presented at the National Conference on Artificial Intelligence, Seattle, WA, August 1987.

*Selecting Appropriate Representations for Learning from Examples*, presented at The National Conference on Artificial Intelligence, Philadelphia, PA, August 1986.

## **Invited Posters:**

*Isolating Specific Cells in Mixed Population Cultures: A Computational Approach*, presented at the Institute for Systems Biology's 9th annual international symposium, Systems Biology & Global Health.

*Improving the Accuracy and Robustness of Genetic Programming through Expression Simplification*, presented at Genetic Programming 1996, Stanford, CA, July 1996.

*Designing Error Correcting Codes for Learning in Context* presented at the Machines that Learn Workshop, Snowbird, UT, April 1995.

*A Hierarchical Approach to Recognizing On-line Cursive Handwriting*, presented at the Seventh Annual Conference on Neural Information Processing Systems: Natural and Synthetic 1993, Denver, CO, December 1993.

*On-line Cursive Handwriting Recognition Using Time-delayed Neural Networks: Preliminary Results*, presented at the British Neural Network Society Symposium on Recent Advances in Neural Networks, Lucas Institute, University of Birmingham, Edgbaston, Birmingham, UK, January 1993.

***Strong Abstraction: Exploiting Knowledge to Derive Useful Abstractions in Complex Domains***, presented at the Symposium on Learning Methods for Planning and Scheduling, Stanford University, CA, January 1991.