
FREDERICK L. CRABBE IV

U.S. Naval Academy
Computer Science Department
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EDUCATION

- University of California, Los Angeles, CA.** 7/96-6/00
Ph.D. Dissertation: "DiscoTech: Construction and Learning Among Neurally Controlled Animats."
Advisor: Michael G. Dyer.
- University of California, Los Angeles, CA.** 9/92-6/96
M.S. Major in Artificial Intelligence, minors in Linguistics and Databases.
- Dartmouth College, Hanover, NH.** 9/88-6/92
A.B. Major: Computer Science modified with Philosophy. Senior Project: DoubleSpeak- A Macintosh chat client and server using the Unix talk protocol.

EMPLOYMENT

- U.S. Naval Academy, Annapolis, MD.** 8/13-Present
Professor. Continuing a research program of machine learning and biological modeling in robotics.
- Carnegie Mellon University, Language Technologies Institute, Pittsburgh, PA.** 6/14-7/15
Visiting Professor. Participated in research projects on semantic parsing.
- U.S. Naval Academy, Annapolis, MD.** 8/05-7/13
Associate Professor. Developed a research program of machine learning and biological modeling in robotics.
- Carnegie Mellon University, Robotics Institute, Pittsburgh, PA.** 6/07-7/08
Visiting Professor. Participated in research projects on human robot collaboration and communication.
- U.S. Naval Academy, Annapolis, MD.** 8/00-8/05
Assistant Professor. Developed a research program of Machine Learning in Robotics.
- University of California, Los Angeles, CA.** 9/97-7/00
Research Assistant. Researched and wrote dissertation on neural-net controlled agents that learn and survive in a construction environment.
- Sun Microsystems Laboratories, Chelmsford, MA.** 6/95-9/97
Research Intern. Developed applications using speech interfaces. Developed novel semantic and discourse modeling techniques.
- Air Force Research Laboratories-Rome Labs, Rome, NY** 6/94-9/94
Research Intern. Used word co-occurrences to cluster words in high dimensional space, resulting in pseudo-semantic clusters of word vectors.
- Los Alamos National Laboratory, Los Alamos, NM** 6/93-9/93
Research Intern. Trained self-organizing Kohonen Feature Maps to analyze trouble spots in acoustic data to identify the shape of a speaker's vocal-tract.

HONORS

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| Frank Chi Teaching Award , CS Dept, US Naval Academy | 2002,03,09,10,12,16 |
| USNA Service Award Nomination , CS Dept, US Naval Academy | 2016 |
| Fred Skove Research Award , CS Dept, US Naval Academy | 2006,08 |
| USNA Apgar Award Nomination , US Naval Academy | 2004 |
| Outstanding Paper , Sun Microsystems Laboratories, The First Ten Years | 2001 |
| Honorary Inductee , Golden Key International Honour Society. | 2001 |
| Best Paper of Session Award , International Joint Conference on Neural Networks | 1999 |
| John G. Kemeny Computing Prize , Dartmouth College | 1992 |
| Class of 1884 Scholarship , Dartmouth College | 1990 |

TEACHING EXPERIENCE

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| U.S. Naval Academy. | 8/00-Present |
| SI420 Artificial Intelligence. | |
| SI475 Intelligent Robotics. | |
| SI481L MatLab for Economics Majors. | |
| IT486B Natural Language Processing. | |
| SI321 Advanced Data Structures. | |
| IC312 Data Structures. | |
| SI283 C Programming for Engineers. | |
| SM242 Discrete Math and Probability | |
| IC221 Systems Programming. | |
| IC211 Object Oriented Programming. | |
| IC210 Introduction to Computing. | |
| SI204 Introduction to Computer Science. | |
| SI110 Introduction to Cyber Security. | |
| UCLA Marina Aquatic Center , Sailing program. | |
| <i>Certified Instructor.</i> Taught all levels of small boat sailing to adults | 6/99-8/00 |
| <i>Teaching Assistant.</i> Provided sailing instruction at all levels of small boat sailing. | 9/97-6/99 |
| UCLA Computer Science Department. | 1/93-6/96 |
| <i>Teaching Assistant.</i> Lectured 2-4 hours per week, held office hours 2 hours per week, designed and graded assignments and final projects for: | |
| Computer Science 163, Introduction to Natural Language Processing, | |
| Computer Science 161, Fundamentals of Artificial Intelligence, | |
| Computer Science 111, Operating Systems Principles, | |
| Computer Science 32, Introduction to Computer Science 2. | |

JOURNAL ARTICLES

- Brown, C., Crabbe, F., Doerr, R., Greenlaw, R., Hoffmeister, C., Monroe, J., Needham, D., Phillips, A., Schall, S., Schultz, J., Simon, S., Stahl, D., Standard, S., *Anatomy, Dissection, and Mechanics of an Introductory Cyber-Security Class's Curriculum at the United States Naval Academy*. ASEE Computers in Education Journal, 22(3), 2012.
- Crabbe, F.L. *Compromise Strategies for Action Selection*. The Philosophical Transactions of the Royal Society, Part B, vol 362, September 2007.
- McMath, S., Crabbe F., Joyner D. *Continued fractions and Parallel SQUFOF*. International Journal of Pure and Applied Mathematics 34(1), 2007, pp. 19-38.
- Crabbe, F., *Unifying Undergraduate Artificial Intelligence Robotics: Layers Of Abstraction Over Two Channels* AI Magazine, 27(1), 2006, pp 23-37.
- Bishop, B., Crabbe, F. and Hudock, B., *Design of a Low-Cost, Highly Mobile Urban Search and Rescue Robot*. Advanced Robotics. 19(8) 2005, pp. 797-928.
- Crabbe, F., Dyer, M., *Goal Directed Adaptive Behavior in Second-Order Neural Networks: The MAXSON family of architectures*. Adaptive Behavior, 8(2), 2001. pp. 149-171.
- Martin, P., Crabbe, F., Adams, S., Baatz, E., Yankelovich, N., *SpeechActs: A Spoken Language Framework*. IEEE Computer, 29(7), 1996. pp. 33-40.

BOOK CHAPTERS

- Crabbe, F.L. *Compromise Strategies for Action Selection* in Modelling Natural Action Selection, Seth Bryson and Prescott, Eds. Cambridge University Press, 2010.
- Martin, P., Crabbe, F., Adams, S., Baatz, E., Yankelovich, N., *SpeechActs: A Spoken Language Framework*. in Sun Microsystems Laboratories: The First Ten Years 1991-2001, Treichel and Holzer, eds. Sun Labs, 2001, pp. 10.1-10.10. (This is a reprint of the IEEE Computer paper above).
- Crabbe, F., Dyer M., *Goal Directed Adaptive Behavior in Second-Order Neural Networks: Learning and Evolving in the MAXSON architecture*. in “Advances in the Evolutionary Synthesis of Intelligent Agents,” Honavar and Patel eds. MIT Press, 2001

CONFERENCE PAPERS

- Dawkins, J., Crabbe F.L., and Evangelista, D. *Deployment and Flight Operations of a Large Scale UAS Combat Swarm: Results from DARPA Service Academies Swarm Challenge*. to appear in the proceedings of the International Conference on Unmanned Aircraft Systems, 2018.
- Brown, C., Crabbe, F., Doerr, R., Greenlaw, R., Hoffmeister, C., Monroe, J., Needham, D., Phillips, A., Pollman, A., Schall, S., Schultz, J., Simon, S., Stahl, D., Standard, S. *Anatomy, Dissection, and Mechanics of an Introductory Cyber-Security Class's Curriculum at the United States Naval Academy*. in the proceedings of the 17th Annual Conference on Innovation and Technology in Computer Science Education, 2012, pp 303-308.
- Brown, C., Crabbe, F., Doerr, R., Greenlaw, R., Hoffmeister, C., Monroe, J., Needham, D., Phillips, A., Schall, S., Schultz, J., Simon, S., Stahl, D., Standard, S., *Developing and Implementing an Institution-Wide Introductory Cyber-Security Course in Record Time*. In the 50th ACM Southeast Conference, 2012.
- Crabbe, F.L. *Efficiently finding (nearly) minimal FST of repetitive unsegmented demonstration data*. in the proceedings of the International Conference on Agents and Artificial Intelligence (ICAART), 2012.
- Lee, M.K., Forlizzi, J., Rybski, P.E., Crabbe, F., Chung, W., Finkle, J., Glaser, E., and Kiesler, S. *The Snackbot: Documenting the design of a robot for long-term Human-Robot Interaction*. in Proceedings of the 4th International Conference on Human-Robot Interaction (HRI), 2009, pp. 7-14.
- Crabbe, F.L., *On Compromise Strategies for Action Selection with Proscriptive goals*. In the proceedings of Modeling Natural Action Selection, 2005, p. 24-31.
- Crabbe, F.L., *Optimal and Non-Optimal Compromise Strategies in Action Selection*. In the proceedings of the Eighth International Conference on Simulation of Adaptive Behavior (SAB), 2004. pp. 233-242.
- Hudock, B.M., Bishop, B.E. and Crabbe, F.L., *On the Development of a Novel Urban Search and Rescue Robot*, in Proceedings of the Thirty-Sixth Southeastern Symposium on System Theory, 2004, pp. 451-455.
- Fong, E., Adams, W., Crabbe, F.L., Schultz, A. C., *Representing a 3-D Environment with a $2\frac{1}{2}$ -D Map Structure*. In the proceedings of the International Conference on Intelligent Robotics and Systems (IROS), 2003, pp. 2986-2991.
- Crabbe, F.L., *On Learning to Select Actions in Multiple Goal Scenarios*. In the proceedings of the International Conference on Computational Intelligence for Modeling Control and Automation (CIMCA), 2003. pp. 247-257.
- Crabbe, F.L., *Compromise Candidates in Positive Goal Scenarios*. In the proceedings of the Seventh International Conference on Simulation of Adaptive Behavior (SAB), 2002. pp. 105-106.
- Crabbe, F.L., *Multiple Goal Q-Learning: Issues and Functions*. In the proceedings of the International Conference on Computational Intelligence for Modeling Control and Automation (CIMCA), 2001, pp. 179-185.
- Crabbe, F.L., and Dyer M.G., *Observation and Imitation: Goal Sequence Learning in Neurally Controlled Construction Animats: VI-MAXSON*. In the proceedings of the Sixth International Conference on Simulation of Adaptive Behavior (SAB), 2000, pp. 373-382.
- Crabbe, F.L., and Dyer M.G., *Second-order networks for wall-building agents*. In the proceedings of the International Joint Conference on Neural Networks (IJCNN), 1999, #314.
- Crabbe, F.L., and Dyer, M.G., *Vicarious learning in mobile neurally controlled agents: The V-MAXSON architecture*. In the proceedings of the International Conference on Artificial Neural Networks (ICANN), 1999, pp. 904-909.

EDITED VOLUME

Crabbe, F., Smart, W., Tejada, S. Eds. Proceedings of the AAAI Robot Competition Workshop. 2004.

BOOK REVIEW

Crabbe, F.L., *Unifying Artificial Intelligence Robotics: An Undergraduate Textbook* Adaptive Behavior, 9(2), 2001, pp. 119-122.

INVITED LECTURES

Compromise Strategies for Action Selection. Intelligent Systems Program, University of Pittsburgh. March 3, 2006
Unifying Undergraduate Artificial Intelligence Robotics: Layers Of Abstraction Over Two Channels. AAAI Spring Symposium on Robotics Education, Stanford University. March 22, 2004.
Artificial Intelligence: Where It's Come From, Where It's Going, and Why It's Hard. Society of American Military Engineers, Annapolis, MD. February 19, 2004.
Undergraduate Robotics: A New Synthesis. Olin College of Engineering, Needham, MA. April 10, 2003.
Construction and Learning Among Neurally Controlled Animats. Emory University, Atlanta, GA. March 29, 2000.
Learning and Cooperation in Neurally Controlled Agents. Intel Research Laboratories, Beaverton, OR. March 23, 1999.

PROFESSIONAL ACTIVITIES

Workshop Chairmanship:

AAAI Robot Competition Workshop 2004

Program Committees:

Modeling Natural Action Selection 2005
Computational Intelligence for Modeling Control and Automation 2004
Genetic and Evolutionary Computation Conference 2002

Session Chairmanships:

Computational Intelligence for Modeling Control and Automation 2003
Computational Intelligence for Modeling Control and Automation 2001

Journal Reviewing:

Philosophical Transactions of the Royal Society, Part B
Adaptive Behavior
IEEE Transactions on Man, Systems, and Cybernetics
Journal of Artificial Societies and Social Simulation
Trends in Cognitive Science

Grant Reviewing:

NIST Advanced Technology Program 05/2004
NIST Advanced Technology Program 06/2002
NIST Advanced Technology Program 10/2002

Other:

Maintainer USENET comp.ai FAQ 3/99-6/05

GRANTS AWARDED

Office of Naval Research 2001-2011
Grant #s N0001401WR20392, N0001402WR20367, N0001403WR20241,
N0001404WR20377, N0001405WR20042, N0001406WR2015,
N0001408WR20196
Defense-wide Information Assurance Program 2012-2013

ACADEMY SERVICE

Yard:

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|---|---------------|
| Faculty Senator | 2008-11,15-18 |
| Faculty Midshipman Relations Committee, Chair | 2016-18 |
| Trident Committee | 2013-2014 |
| Academic Information Resources Committee, Faculty Senate, Chair | 2008-11 |
| Computing Subcommittee | 2008-11 |
| USNA Cyberwarfare ad hoc committee | 2010-11 |
| Faculty Senate Midshipmen Laptop ad hoc committee | 2010 |
| Center for Cyber Security Studies Director Search Committee Chair | 2010 |
| Truman Committee | 2007-09,12-13 |
| Graduate Education Committee | 2005-07 |
| Ryan Scholarship coordinator | 2002-04 |
| McMullen Scholarship coordinator | 2001-02,05 |
| Naval Academy Research Committee | 2003-04 |

Division:

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| Curriculum Committee | 2009-13 |
| Michelson Lecture Committee | 2009-10 |
| Trident Committee | 2005 |
| Naval Academy Research Committee | 2003-05 |

Department:

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| Special Advisor to Double Majors | 2009-14 |
| Distinguished Speaker Series Administrator | 2005-06,08-11 |
| Robotics administrator | 2000-18 |
| Faculty Search Committee, Chair | 2010-11,16-18 |
| Faculty Search Committee | 2002, 04-05,12-13 |
| Curriculum Committee Chair | 2008-13 |
| Curriculum Committee | 2001-02,05 |
| Systems Committee | 2003-04,08-09, 15-16 |
| ACM Student Organization Faculty Representative | 2002-06 |
| Research Committee, Chair | 2003-07 |
| Graduate Scholarship Advisor | 2000-02 |