CHRISTOPHER W. LUM, PhD

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SUMMARY OF QUALIFICATIONS

- Industrious, detail oriented, and hard working individual.
- Excellent oral, written, public speaking, and interpersonal communication skills.
- Experienced technical researcher in the fields of autonomous systems, aeronautics, and aviation.
- Adept at transferring abstract concepts to physical products and implementations.

EDUCATION

University of Washington, Seattle, WA
Doctor of Philosophy in Aeronautical and Astronautical Engineering, 2009. GPA: 3.93

- Created multi-agent simulation software for heterogeneous, autonomous systems.
- Designed and implemented a human-in-the-loop simulator for algorithm verification and validation.
- Produced a highly accurate target identification system using low dimensional sensors.
- Designed team based algorithms for conducting a coordinated search missions for multi-agent systems.

Master of Science in Aeronautical and Astronautical Engineering, 2005. GPA: 3.94

- Performed research in high level simulations of multi-vehicle systems engaged in complex missions.
- Completed courses in state estimation, probabilistic robotics, mechanical vibration, and linear systems.

Bachelor of Science in Aeronautical and Astronautical Engineering, 2003. GPA: 3.65

- Performed stability and control analysis of a highly maneuverable remote piloted vehicle for capstone project.
- Completed courses in dynamics and control, structural mechanics, fluid dynamics, aerodynamics, space flight, propulsion systems, and electronic systems.

PROFESSIONAL EXPERIENCE

University of Washington, Seattle, WA
Post-Doctoral Research Associate, 2009 - Present

- Oversee and manage graduate students in the Autonomous Flight Systems Laboratory.
- Perform research in strategic autonomous systems including integration onto Boeing hardware test beds.

Research Assistant, 2004 - 2009

- Performed research in unmanned aerial vehicles and autonomous flight systems including guidance and intelligent decision making.
- Conducted simulation analysis and development of autonomous algorithms with software and hardware-in-the-loop simulations.
- Developed guidance algorithms for active target searching using autonomous agents and aeromagnetic data.

The Insitu Group, Bingen, WA
Engineering Intern, 2004

- Developed embedded applications using the INTEGRITY real-time operating system for a production autonomous air vehicle.
- Drafted documentation regarding the development of kernel/dynamically downloaded applications for the Embedded Planet 8260 single board computer.

Kirsten Wind Tunnel, Seattle, WA
Crew Chief, 2003

- Trained crew in the theory and methods of data reduction and acquisition in a wind tunnel setting.
- Managed approximately 10 crew members while operating the wind tunnel.

Crew, 2001 – 2003

- Responsible for operating the wind tunnel and maintaining testing equipment.
- Performed data acquisition, reduction, and analysis for wind tunnel customers.

TEACHING EXPERIENCE

University of Washington, Seattle, WA
Instructor, 2007 - 2008

- Primary instructor for AA516-Stability and Control of Flight Vehicles.
- Responsibilities included performing 30 lectures per quarter, creating homework and exams, and holding office hours for approximately 30 students.

Teaching Assistant, 2003 - 2004

- Teaching assistant for classes AA448-Control Systems Sensors and Actuators, AA449-Design of Automatic Control Systems, AA450-Controls in Aerospace Systems, and AA547-Linear System Theory.
- Responsibilities included lecturing class, grading exams and homework, setting up and maintaining laboratory experiments, guiding students in laboratory assignments, and holding office hours.

Husky Winter Sports, Seattle, WA
President, 2002

- Managed Husky Winter Sports ski/snowboarding school at Steven's Pass, WA servicing approximately 200 students.
- Supervised 25 ski and snowboarding instructors.

Ski Instructor, 1999-2002

- Successfully taught groups of 6-8 students how to ski or improve existing skills in clinics and lessons.

Mercer Island Parks and Recreation, Mercer Island, WA
Tennis Coach & Instructor, 1999-2000

- Coached a summer league tennis team of approximately 15 members aged 10-16 years.
- Organized weekly team matches/tournaments with other local teams.

COMPUTER SKILLS

- Engineering Applications: Matlab, Simulink, Stateflow, Mathematica, C/C++, HTML, Perl, CGI
- Other: LaTeX, DreamWeaver, Photoshop, Premiere, Word, Outlook, Excel, PowerPoint

ACCOMPLISHMENTS AND AWARDS

- 2009: Best Student Technical Paper Award, AIAA Infotech@Aerospace Conference
- 2008: Outstanding Paper Award, AIAA Aerodynamic Measurement Technology and Ground Testing Conference
- 2007: NASA Space Grant Consortium Graduate Fellowship recipient
- 2005: Osberg Family Trust fellowship recipient
- 2004: Nominated for the University of Washington Outstanding Teaching Assistant Award
- 2003: Andris Vagners Memorial Fellowship recipient
- 2002: Employee of the Quarter – Kirsten Wind Tunnel, Seattle WA, Summer quarter
- 2002: University of Washington Aeronautics and Astronautics Alumni Scholarship recipient
- 2002: George E. Solomon Academic Award recipient
- 2002: Sigma Gamma Tau Aerospace Honor Society member
- 2002: UW Dean's List: Winter, Spring, Summer, and Autumn quarters
- 2001: Employee of the Quarter – Kirsten Wind Tunnel, Seattle WA, Summer quarter
- 2001: UW Dean's List: Winter, Spring, and Autumn quarters

PUBLICATIONS

- C.W. Lum. Coordinated Searching and Target Identification Using Teams of Autonomous Agents. PhD thesis, University of Washington, Seattle, WA, March 2009.

- C.W. Lum, R.T. Rysdyk, and J. Vagners, "A Search Algorithm for Teams of Heterogeneous Agents with Complete Coverage Guarantees" Submitted to the AIAA Journal of Aerospace Computing, Information, and Communication

- C.W. Lum, M. L. Rowland, R.T. Rysdyk, and J. Vagners, "Rapid Verification and Validation of Strategic Autonomous Algorithms Using Human-in-the-Loop Architectures" Submitted to the AIAA Journal of Aircraft

- C.W. Lum and J. Vagners, "A Modular Algorithm for Exhaustive Map Searching Using Occupancy Based Maps" Proceedings of the AIAA Infotech@Aerospace Conference, April 2009 (Best Student Technical Paper Award)

PUBLICATIONS (continued)

- C.W. Lum and R.T. Rysdyk, "Feature Extraction of Low Dimensional Sensor Returns for Autonomous Target Identification" Proceedings of the AIAA Guidance, Navigation, and Control Conference, August 2008

- C.W. Lum, M. L. Rowland, and R.T. Rysdyk, "Human-in-the-Loop Distributed Simulation and Validation of Strategic Autonomous Algorithms" Proceedings of the AIAA Aerodynamic Measurement Technology and Ground Testing Conference, June 2008 (Outstanding Paper Award)

- C.W. Lum and R.T. Rysdyk, "Time Constrained Randomized Path Planning Using Spatial Networks" Proceedings of the AACC American Control Conference, June 2008

- C.W. Lum, R.T. Rysdyk, and A. Pongpunwattana, "Occupancy Based Map Searching Using Heterogeneous Teams of Autonomous Vehicles" Proceedings of the AIAA Guidance, Navigation, and Control Conference, August 2006

- C.W. Lum, R.T. Rysdyk, and A. Pongpunwattana, "Autonomous Airborne Geomagnetic Surveying and Target Identification" Proceedings of the AIAA Infotech@Aerospace Conference, September 2005

- R.T. Rysdyk, C.W. Lum, and J. Vagners, "Autonomous Orbit Coordination for Two Unmanned Aerial Vehicles" Proceedings of the AIAA Guidance, Navigation, and Control Conference, August 2005

SELECT PRESENTATIONS

- "Development of High Level Autonomous Algorithms and Implementation Using Pilot Interaction," EAA Chapter 26 Meeting, May 14, 2009.

- "Coordinated Searching and Target Identification Using Teams of Autonomous Agents," PhD Final Examination, March 3, 2009.

- Student Keynote Speaker, University of Washington Guggenheim Renovation Celebration, October 27, 2008.

- "Advances in Unmanned Systems: Research Activity from the University of Washington Department of Aeronautics and Astronautics," Pacific Northwest AIAA Technical Symposium, October 25, 2008.

- "Cooperative Searching and Geomagnetic Surveying Using Teams of Autonomous Agents," NASA Future Forum Poster Session, January 25, 2008.

- "The Autonomous Flight Systems Laboratory: Tools, Research, and Applications," University of Washington Department of Aeronautics and Astronautics Graduate Seminar, October 30, 2006.

- "Cooperative Searching and Geomagnetic Surveying Using Teams of Autonomous Agents," PhD General Examination, June 12, 2006.

- "UAVs and Their Applications: Research at the Autonomous Flight Systems Laboratory," University of Washington Department of Aeronautics and Astronautics Graduate Seminar, May 16, 2005.

RESEARCH INTERESTS

- Autonomous systems
- Strategic autonomous algorithms
- Numerical simulation and modeling
- Human-in-the-loop systems and simulation
- Embedded systems
- Discrete event systems

MISCELLANEOUS

- Citizenship: USA
- Avid cyclist and skier. Additional hobbies include hiking, kayaking, triathlons, ballroom dancing, and travel.
- Office contact: University of Washington, Autonomous Flight Systems Laboratory, Box 352400, Seattle, WA 98195-2400. Ph. (206) 543-7748