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 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 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.

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.

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.

PROFESSIONAL EXPERIENCE (continued)

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.

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)

- 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