JAMES MCMAHON **CV**

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EDUCATION

2012-2016	Ph.D.	Computer Science	The Catholic University of America

Thesis Title: ***Towards Combined Task and Motion Planning for Autonomous Underwater Vehicles***
PhD Advisor: Dr. Erion Plaku

2009-2012	M.S.	Mechanical Engineering	The Catholic University of America
2005-2009	B.S.	Mechanical Engineering	The Catholic University of America

PROFESSIONAL EXPERIENCE

2016 - now	The Naval Research Laboratory	Computer Scientist
2009 - 2016	The Naval Research Laboratory	Mechanical Engineer
2008 - 2009	The Naval Research Laboratory	Research Assistant
2007 - 2008	NAVAIR Lakehurst	ONR NREIP Internship

RESEARCH

Robotics

- **Combined Task and Motion Planning:** Enhancing the autonomy of unmanned systems by developing computational frameworks that consider the underlying dynamics of the robot, the complex environment it is operating in, and the high-level tasks it needs to accomplish during the planning and re-planning phases.
- **Autonomous Underwater Vehicles:** Enhancing the motion and mission planning capabilities of autonomous underwater vehicles in order to perform complex missions at sea (e.g. Long Endurance, Mine Countermeasures, Surveillance).
- **Mobile Robotics:** Developing robust planning and replanning algorithms for robot platforms operating in cluttered environments to accomplish their pre-assigned tasks while avoiding collision with obstacles.
- **Goal Reasoning for Autonomous Underwater Vehicles:** Enhancing the autonomy of autonomous underwater vehicles by employing Goal Reasoning to dynamically formulate, prioritize, and assign goals.

Acoustics

- **Signal Processing:** Developing signal processing techniques in order to record and detect signals on low-power embedded processors.
- **Detection and Classification:** Implementing off the shelf machine learning techniques and algorithms for use on low-power processors to detect and classify acoustic signals.

(last updated, April 2017)

- **Non-Invasive Acoustic Detection:** Designing and testing a system to detect hidden objects in clothing using in-air acoustics.
- **Hearing Loss:** Investigating the effects of small-weapons fire on the hearing loss of soldiers in combat.

FUNDING AWARDS

(2016) NRL 6.2 UWFA: *"Interactive Sensing Aided Autonomy for Unmanned Underwater Vehicles"*
- PI: **Mcmahon J.**
- Funding awarded: **$3,900,000.00**
- Duration: FY17-FY20

(2017) NRL 6.2 UWFA: *"Goal Deliberation for UUV Control"*
- COPI: **Mcmahon J.**
- Funding awarded: **$1,500,000.00**
- Duration: FY18-FY21
- Top-10 FY18 NRL New Start Proposal

PUBLICATIONS

J. McMahon, H. Yetkin, A. Wolek, Z. J. Waters, D. J. Stilwell, **"Towards Real-Time Search Planning in Sub-Sea Environments."** (in review).

A. Wolek, **J. McMahon**, B. R. Dzikowicz, B. H. Houston, "**The Orbiting Dubins Traveling Salesman Problem.**" (in review).

M. A. Wilson, **J. McMahon**, A. Wolek, D. Aha, B. H. Houston, "**Towards Goal Reasoning for Autonomous Underwater Vehicles: Responding to Unexpected Agents**." (in review).

M. K. Zalalutdinov, D. M. Photiadis, W. G. Szymczak, **J. W. McMahon**, J. A. Bucaro, and B. H. Houston, **"Mesh-type acoustic vector sensor."** (in review).

J. McMahon and E. Plaku, (2017) **"Autonomous Data Collection With Limited Time for Underwater Vehicles,"** IEEE Robotics and Automation Letters, vol.2, no.1, pp.112-119.

J. McMahon and E. Plaku, (2017) **"Robot Motion Planning with Task Specifications via Regular Languages,"** Robotica, vol. 35, no. 1, pp. 26-49.

J. McMahon and E. Plaku, (2016) **"Mission and Motion Planning for Autonomous Underwater Vehicles Operating in Spatially and Temporally Complex Environments,"** IEEE Journal of Oceanic Engineering, vol. 41, no. 4, pp. 893-912.

M. A. Wilson, **J. McMahon**, A. Wolek, D. Aha, B. Housoton, (2016) "**Toward Goal Reasoning for Autonomous Underwater Vehicles: Responding to Unexpected Agents,**" in 4th Workshop on Goal Reasoning at the 25th International Joint Conference on Artificial Intelligence.

J. McMahon, B. Dzikowicz, E. Plaku, and B. H. Houston, (2015) **"A Hybrid Planning Framework for Autonomous Vehicles,"** Naval Research Laboratory Review, pp 128-130

J. McMahon and E Plaku, (2015) **"Autonomous Underwater Vehicle Mine Countermeasures via the Physical Traveling Salesman Problem,"** MTS/IEEE Oceans, Washington, DC, pp. 1-5

PUBLICATIONS CONT'D

J. McMahon and E. Plaku, (2014) **"Sampling-Based Tree Search With Discrete Abstractions For Motion Planning with Dynamics and Temporal Logic,"** in IEEE International Conference on Intelligent Robots and Systems, pp. 3726-3733.

E. Plaku and **J. McMahon**, (2014) **"Motion Planning and Decision Making for Underwater Vehicles Operating in Constrained Environments in the Littoral,"** in Towards Autonomous Robotic Systems, A. Natraj, S. Cameron, C. Melhuish, and M. Witkowski, Eds., Springer Berlin Heidelberg, pp. 328-339.

J. McMahon and E. Plaku, (2014) **"Combined Task and Motion Planning for AUVs,"** in Workshop on AI and Robotics, IEEE/RSJ International Conference on Intelligent Robots and Systems, pp. 17–18

M. Roberts, S. Vattam, R. Alford, B. Auslander, J. Karneeb, M. Molineaux, T. Apker, M. Wilson, **J. McMahon**, and D. Aha, (2014) **"Iterative Goal Refinements for Robotics,"** in Workshop on Planning and Robotics at the 24th International Conference on Automated Planning and Robotics.

M. Wilson, J**. McMahon**, and D. Aha, (2013) **"Bounded Expectations for Discrepancy Detection in Goal Driven Autonomy,"** in AAAI-14 Workshop on Artificial Intelligence and Robotics, pp. 50-56

M. Wilson, B. Auslander, B. Johnson, Thomas Apker, **J. McMahon**, and D. W. Aha, (2013) "**Towards Applying Goal Autonomy for Vehicle Control,"** in Goal reasoning: Papers from the Advances in Cognitive Systems Workshop, pp. 127-142.

E. Plaku and **J. McMahon**, (2013) **"Motion Planning With Linear Temporal Logic for Underwater Vehicles Operating in Constrained Environments,"** Workshop on Planning in Continuous Domains, International Conference on Automated Planning and Scheduling, pp. 3

E. Plaku and **J. McMaho**n, **"Combined Mission and Motion Planning to Enhance Autonomy of Underwater Vehicles Operating in the Littoral Zone,"** in Workshop on Combining Task and Motion Planning, IEEE International Conference on Robotics and Automation, 2013 pp. 17–22

P. C. Herdic, **J. W. McMahon**, B. R. Dzikowicz, B. H. Houston, and G. K. Hubler, **"NRL Technical Year End Progress Report for MCSC PM-ICE FY11 SOW Tasks 1 and 2 – Hearing Loss Research,"** The Naval Research Laboratory, Washington, DC, MCSC PM-ICE, 2012.

AWARDS

2016 - Awarded PhD with distinction
2015 - NRC/ASEE Postdoc Publication Award

PROFESSIONAL ACTIVITIES

2014 - now	Member, AAAI
2013 - now	Reviewer, IEEE (Robotics and Automation Letters, International Conference on Robotics and Automation, International Conference on Intelligent Robots and Systems)
2012 - now	Member, IEEE (Robotics and Automation Society, Oceanic Engineering Society)