Carina Poulin, Ph.D.

321 345-3858 | photic.science@gmail.com

Ocean optics scientist with experience in science communication and team management

- Creative and independent researcher with 4 published articles and 13 presentations
- Passionate for innovating and problem-solving
- Rigorous and efficient at producing high-quality data, always seeking a challenge
- Excellent at communicating with people from various backgrounds and teamwork-oriented

Education

Ph.D. - Remote sensing, Physics of Remote Sensing, University of Sherbrooke, Qc, Canada (2013-2018)
M.Env. - Research, University of Sherbrooke, Qc, Canada (2009-2012)
B.Sc. - Ecology, Co-op, University of Sherbrooke, Qc, Canada (2004-2007)

Research and professional experience

| Scientific consultant/Founder

Photic Science | 2022-present

Helping scientists with communications and scientific projects. Writing and editing articles. Offering grant proposal assistance, laboratory trainings, data processing and project management services.

| Postdoctoral fellow

Florida Atlantic University - Harbor Branch Oceanographic Institute | 2020-2022

Advisor: Michael Twardowski

Project: Bioluminescence response (within a project funded by the Office of Naval Research)

Conducted literature review and experimental research on the bioluminescence response of planktonic organisms to different stimuli in the context of the development of a bioluminescence sensor. Worked within a multidisciplinary team. Studied optical properties of bioluminescent plankton (polarization, fluorescence, scattering, absorption). Mentored a Master's student working on the bioluminescence response of ctenophores.

| Postdoctoral research associate/Lab manager

The University of Southern Mississippi | 2019-2020

Advisor: Xiaodong Zhang

Project: Understanding the natural variability of angular scattering by oceanic particles

Established and maintained a new ocean optics laboratory equipped for phytoplankton culturing and monitoring of their optical properties (Coulter Counter Multisizer 4e, Turner Fluorometer, Abbe Refractometer, etc.). Created a method for a new instrument in the field that measures 3D refractive index maps of particles: the 3D Cell Explorer. Devised experiments to study the relationships between particle structure and scattering. Analyzed data and planned for April-May 2020 NASA EXPORTS North Atlantic Cruise. Wrote scientific publications. Supervised a lab technician.

| Research assistant - Communications

University of Sherbrooke, Canada | Jan-May 2019

Helped researchers on their funding proposals, devised a plan to improve social cohesion of the group, rebuilt website, organized invited conferences, used graphic design techniques and tools.

| Ph.D. - Remote Sensing

University of Sherbrooke, Canada | 2013-2018

Advisor: Yannick Huot, Co-advisor David Antoine, Curtin University, Australia

Project: Diel variations of the optical properties of phytoplankton

Designed and conducted laboratory experiments to study the optical properties of phytoplankton. Worked in a multidisciplinary team. Used the results of the experiments in optical models. Published two articles, presented 6 posters and presentations at national and international conferences.

| Research assistant - Bioreactors

University of Sherbrooke and OSEMI Canada, Canada | 2013

Responsibilities: Studied the growth of microalgae in bioreactors for biofuel production. Followed their physiology by fluorescence. Optimized cultivation conditions with engineers. Reported and communicated results to the team on a daily basis. Supervised an intern. Ordered equipment and maintained the laboratory. Occasional field sampling in a lake (optics, filtrations, zoo/phytoplankton, YSI, nutrients, Secchi, etc.).

| M.Env. - Research University of Sherbrooke, Canada | 2009-2013

Advisor: Yannick Huot, Co-advisor: Marie-Helene Laprise, CEGEP de Sherbrooke, Canada

Project: The impact of light pollution on the ecophysiology of cyanobacteria

Designed and developed an automated culture chamber (CO_2, pH, temperature, culture medium based on turbidity, lighting) with engineers and researchers. Designed and developed a photosynthetron (temperature-controlled growth chamber with adjustable lighting) with engineers and researchers. Collaborated with the Mount Allison Phytoplankton Cluster in New Brunswick. Collaborated with the IGB Leibniz-Institute of Freshwater Ecology and Inland Fisheries to prepare a conference. Published an article in the Journal of Phytoplankton Research and presented 4 scientific posters in national and international conferences as well as an international oral presentation.

Publications

Articles

- Zhao, Poulin, McKee, Hu, Agagliate, Yang and Zhang (2019). A closure study of ocean inherent optical properties using flow cytometry measurements. Journal of Quantitative Spectroscopy and Radiative Transfer, 106730.
- Poulin, Zhang, Ping and Huot (2018) Diel variations of the attenuation, backscattering and absorption coefficients of four phytoplankton species and comparison with spherical, coated spherical and hexahedral particle optical models, J. Quant. Spectrosc. Radiat. Transfer, 217, 288-304.
- Poulin, Antoine and Huot, Y. (2018). Diurnal variations of the optical properties of phytoplankton in a laboratory experiment and their implication for using inherent optical properties to measure biomass, Optics Express, 26(2), 711-729.
- Poulin, Bruyant, Laprise, Cockshutt, Marie-Rose Vandenhecke, Huot (2014) The impact of light pollution on diel changes in the photophysiology of Microcystis aeruginosa, J. Plankton Res. 36 (1): 286-291

Selected Presentations* and Posters

- Poulin, McFarland, Nayak, Malkiel, Barua, Josset, Latz and Twardowski (2022) Observing bioluminescence first flash kinetics of dinoflagellate individual cells using a low-shear stress millifluidics approach, Ocean Sciences Meeting 2022, Virtual Meeting
- *Poulin and Zhang (2020) Evaluating holotomography as a new way to measure the refractive index of phytoplankton. Ocean Sciences Meeting 2020, San Diego, USA.
- Poulin, Zhang and Huot (2018) Using diurnal variations of optical properties of cultures in a laboratory experiment to verify the applicability of spherical and hexahedral particle models to phytoplankton, Ocean Sciences Meeting 2018, Portland, USA.
- Poulin, Zhang and Huot (2017) Using diurnal variations in a lab experiment to verify the applicability of Mie calculations to phytoplankton, International Ocean Color Science Meeting 2017, Lisbon, Portugal.
- Poulin, Zhang and Huot (2017) Using diurnal variations in a lab experiment to verify the applicability of Mie calculations to phytoplankton, NetCOLOR meeting, Halifax, Canada.
- *Poulin and Huot (2016) Diurnal Variations of Optical Properties of Four Species of Oceanic Phytoplankton and their Co-Varying Variables, Ocean Sciences Meeting 2016, New Orleans, USA.
- Poulin and Huot (2015) Diel variations of the optical properties of oceanic phytoplankton, GEO-CAPE 2015 Open Community Workshop, Raleigh, USA
- *Poulin, Bruyant, Laprise, Cockshutt, Marie-Rose Vandenhecke, Huot (2013) The impact of light pollution on *Microcystis aeruginosa*, ALAN 2013 First International Conference on Artificial Light at Night, Berlin, Germany.
- Poulin, Bruyant, Laprise, Cockshutt, Marie-Rose Vandenhecke, Huot (2013) The impact of light pollution on the photophysiology of *Microcystis aeruginosa*, ASLO 2013 Aquatic Science Meeting, Learning for the Future, New Orleans, USA.
- *Poulin, Bruyant, Lambert, Laprise, Marie-Rose Vandenhecke, Huot (2011) Effets de la pollution lumineuse sur l'écophysiologie des cyanobactéries, 79e congrès de l'ACFAS, La société des savoirs, Sherbrooke, Canada.
- *Poulin (2007) Revue des problématiques écologiques liées à l'éclairage artificiel. International Dark-Sky Association International Symposium, Notre-Dame-des-Bois, Canada.
- *Pfister, Charbonneau, Ducharme, Houle, Poulin, Randlett, Rioux-Perreault (2004) Aerosol optical depth approximation using an optimization-subdivision method. The International Symposium on Optical Science and Technology, Denver, USA

Technical Skills

Working in and managing phytoplankton optics and ecophysiology laboratories, including:

Inherent Optical Properties (IOPs) measurements with an ac-s and ECO-BB9, instrument calibration, data processing and analysis, protocol redaction. Abbe refractometer. Refractive index imaging. PAR measurements.

Continuous (turbidostats), semi-continuous and batch cultures, in vivo fluorescence measurements, chlorophyll extractions, sample preparation for CHN analysis, Coulter counter cell counts, PvsE curves, microscopy and Flowcam.

Data processing and communication:

Programming : MATLAB, Python, optical modeling, data processing and visualisation, statistics

Basic satellite data processing (SeaDAS)

Basic image processing with Fiji

Languages: French and English

Public speaking, excellent oral and written communication skills

Team leading, teamwork, project management, problem solving

Basic design (Photoshop, Gimp, Inkscape etc.), Web design, photography

Microsoft Office (Word, Excel, Powerpoint) and iWork (Keynote and Pages)

Past Entrepreneurship

CEO and co-founder of Time Passport Inc. (2015-2019)

Manage a multidisciplinary team of 5 to 6 people from various fields (design, administration, history, augmented reality, 3D). Partner with Ancient History Encyclopedia for historical content.

Production of a demo application (Seven Wonders AR) that allows users to walk and hunt treasures in a life-size replica of Babylon's hanging gardens as well as experience the seven wonders of the world in augmented reality.

Production of a functional prototype of a geolocated augmented reality mobile application with a historical scene in Quebec City.

One of 20 startups in the world selected for UNESCO's Heritage Lab 2018. Winner of multiple business pitching competitions.

Awards and Honors

- Business pitch competition prizes (Startupfest Sherbrooke, Katalysis) (2017 and 2018)
- One of five companies in the province selected in pitch competition for SXSW Interactive booth (2017)
- IOCCG Summer Lecture Series, Villefranche-sur-Mer (2016)
- FRQNT Doctoral Research Scholarship (2013-2016), 3 years full doctoral scholarship
- Faculty scholarship for promotion of research (2013 and 2017)
- Centre d'applications et de recherches en télédétection (CARTEL) scholarship (2017)
- Admission Scholarship, University of Sherbrooke, department of Biology (2004)
- Association for College Research prize (2004)

Volunteering and Outreach

- Writer and founder of bilingual outreach blog folledenature.com (2017-2019)
- Public outreach science conference : Coeur des Sciences, Montreal. Light pollution and ecology. (2018)
- Team member, eFish (third prize), Aquahacking Summit: United for the St. Lawrence, Montreal (2016)
- Cosponsor, Girls in Science event (Les filles et les sciences, un duo électrisant!) (2014)
- President and secretary, Remote Sensing Graduate Students Association, University of Sherbrooke (CEGGAT) (2010-14)
- Member of the organizing committee for the Environmental Management Master's Degree's Symposium (2010)
- Light pollution awareness volunteer, Mont-Mégantic Astrolab, (TV interview (FR)) (2006)
- Paid summer intern as a naturalist for Parks Canada (2005 and 2007)
- Student researcher, GRAPHYCS, CEGEP of Sherbrooke (2003-2004)
- Peer educator, English and French, CEGEP of Sherbrooke (2003)