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Education

Scripps Institution of Oceanography | University of California, San Diego

- Oceanography, Doctorate (2014 – 2020)

Scripps Institution of Oceanography | University of California, San Diego

- Marine Biology, Master of Science (2014 – 2016)

University of California, Irvine

- Earth & Environmental Sciences, Bachelor of Science (2009 – 2013)
- Minor: Global Sustainability

Research Experience

Postdoctoral Researcher, NASA Jet Propulsion Laboratory (09/2021 – present)

- Next-gen hyperspectral algorithm development to support glacial meltwater detection from remote sensing platforms such as the PRISM and AVIRIS-NG campaigns and NASA's PACE Mission.
- Contribute to advancing the state-of-art in ocean technology to support remotely sensed measurements.

Graduate Researcher (09/2014 – 08/2020) & Research Affiliate (09/2020 – 08/2021)

Scripps Institution of Oceanography, UC San Diego

- Ph.D. Dissertation focuses on understanding meltwater characteristics and their optical features in Antarctic coastal oceans/fjord ecosystems, utilizing machine learning techniques and big-data approaches to understand the impact of environmental change on phytoplankton community composition, and its long-term effects over the Antarctic shelf.
- The dissertation project utilized a multidisciplinary approach and combined multiple techniques including field surveys, satellite remote sensing, modeling, and data science.
- Managed the logistics of multiple Antarctic research expeditions as well as maintained multiple laboratories on SIO campus.

Team Lead/Consultant, NASA DEVELOP at Jet Propulsion Laboratory (06 – 08/2014)

- Managed project development for multiple end users and stakeholders from academia, governmental regulatory agencies, NGOs, and the private sector. Regular reporting to DEVELOP Office at NASA HQ in Washington D.C..
- Researched the feasibility of utilizing multiple satellite sensors to detect and monitor treated wastewater plumes during Hyperion Wastewater Treatment Plant and Orange Counties Sanitation District's diversion events.
- Processed data from SAR-Radarsat-1, ASAR & MERIS-Envisat, PALSAR-ALOS, ASTER-Terra, MODIS-Aqua & Terra, HICO-ISS, TIRS-Landsat 8 to project sea surface temperature, chl-a, and surface roughness data.

Consultant, NASA DEVELOP at Jet Propulsion Laboratory (01 – 04/2013)



- Researched the feasibility of utilizing Synthetic Aperture Radar (SAR) to identify and locate *Sargassum* in the Gulf of Mexico and Atlantic Ocean to better understand and help Bluefin Tuna conservation efforts.
- Processed and Analyzed Advanced Synthetic Aperture Radar (ASAR) imagery from Envisat and ocean color data from MODIS-Aqua and MERIS.

Lab Assistant, Moore's Group, UCI Dept. of Earth System Science (02/2012 – 08/2014)

- Processed and analyzed data retrieved from Aqua MODIS and ETOPO bathymetry to monitor the Austral summer phytoplankton bloom between 2002 and 2013 in the vicinity of the Kerguelen plateau.
- Modified IDL plotting routines for analyzing model output and remote sensing data; users can define any region of interest in the world's ocean, in both 3-degree and 1-degree model grids. Developed model studies for remote sensing projects.

Research Assistant, Rignot's Group, UCI Dept. of Earth System Science (04 -- 08/2013)

- Compiled and analyzed remote sensing data from MODIS to aid the preparation of the research group's Greenland expedition.
- Monitored sea ice conditions in the expedition's path to assist the effort in guiding vessel onboard operations.
- Established a fast delivery system for delivering near-real-time data to the research team in the field.

Undergraduate Researcher, Pataki Lab, UCI Dept. of Earth System Science (09/2009 – 01/2012)

"The influence of N source and fertilizer application on growth of a tropical pitcher plant *Nepenthes sanguinea*" (2011)

- Used nitrogen stable isotope analysis to investigate the nitrogen cycle of carnivorous plants and their physiological response to nutrient addition.
- Responsibilities included writing funding proposals, collecting plant samples in the research greenhouse.

"The linkage between native habitat and plant water use in *Acacia* species" (2009)

- Used carbon stable isotope analysis to investigate water use habit of various *Acacia* species in the LA arboretum.

Undergraduate Researcher, Green IT Lab, California Institute for Telecommunications and Information Technology/UCI School of Information & Computer Science (09/2011 – 03/2013)

The Plant Guild Composer/Food Forest Project

- A multidisciplinary project that attempted to create a functional ecosystem of urban food forest by integrating information technology, remote sensing, and ecology.
- Calibrated programmers' work on ecological concepts and assisted conceptual artist with UI design concepts.
- Contributed cartography on local ecosystems; created maps of local environmental variables to aid site analysis.

The Causality Project

- The collaborative project aimed to provide a participatory environment where users could identify environmental issues and attach causal links to these issues.
- Populated project database, and assisted programmers to incorporate earth and environmental science concepts.



Research Volunteer, Bryant's Lab, UCI Dept. of Developmental & Cell Biology (06 -- 12/2013)

- Provided assistance to conducting microscopy on local plankton species.
- Part of an effort to compile a natural history inventory of Orange County, California.

Teaching Experience

Teaching Assistant, Scripps Institution of Oceanography, UCSD (2015, 2016, 2019, 2020)
SIO3: Life in the Oceans (Prof. Octavi Aburto), SIO134: Introduction to Biological Oceanography (Prof. Mike Landry)

- Assisted the instructors during lecture and record-keeping duties.
- Graded homework and exams.
- Led course's weekly or bi-weekly discussions and review sessions.

Teaching Assistant, UCI COSMOS Program (Summer 2010, 2011, 2012, 2013)

- Assisted the instructors during lecture and field work.
- Assisted students to conduct marine life inventory, plankton tow/identification, and field survey.
- Taught students basic concepts in marine biology and ecology.
- Prepared experiment materials for the students' research projects.

Course Instructor, University Study 7: Environmental Crisis Studies (01/2010 – 06/2013)

- Designed and developed the lesson plan and assembled lecture/discussion material.
- Responsibility included teaching the weekly seminar, engaging students, and grading students' work.
- The class was offered to all UCI students for official elective units.

Teaching Assistant, Earth System Science 138: Remote Sensing (01 – 06/2013)

- Assisted students to better understand various remote sensing techniques and their implications.
- Assisted students during lab sessions to learn various remote sensing software and work with databases to prepare for their final projects.

Lesson Planning Consultant, Ardent Academy (01 – 08/2014)

- Designed and developed lesson plans on experimental physics research programs for middle school students.
- Reported to the academy director on development progress, and assisted with the program's future directions.

Entrepreneurial Experience

Founder & Chief Executive Officer, Ocean Motion Technologies, Inc. (2016 -- present)

- Formed the technical and business teams, board of directors, and advisory council.
- Responsible for system requirement assessment and managing business operations.



- Led the core team on grant proposals and represented the company at business events & competitions.

Founder, Ecojar Lab (2008 – 2014)

- Produced and sold fully self-contained terrariums as ecological art and science education tools.

Co-Producer, Countdown UCI at KUCI Radio Station (2011)

- Countdown UCI is a radio show dedicated to insightful news, discussions and guests from the University of California, Irvine.
- Assisted with producing the show's content, learned to use multiple audio/visual equipment, produced supplementary podcasts
- Utilized targeted advertisement on various social media and assessed community opinions through engagement analytics.

Publications

- **Pan, B.J.** (2020) "The Impact of Seasonal Environmental Variables on Phytoplankton Ecology at the Antarctic Ice-Ocean Boundary: *Studies through Field Work, Numerical Models, Data Science and Machine Learning*. Doctorate Dissertation. Scripps Institution of Oceanography, University of California, San Diego.
- Mascioni, M., Almandoz, G.O., Ekern, L., **Pan, B.J.** and Vernet, M. (2021). Microplanktonic diatom assemblages dominated the primary production but not the biomass in an Antarctic fjord. *Journal of Marine Systems*, p.103624.
- **Pan, B.J.**, Vernet, M., Barton, A.D., and Orona, A.J. (2020) "Environmental Drivers Modulate Phytoplankton Community Seasonal Succession in the Western Antarctic Peninsula". *In Prep*.
- Forsch, K., **Pan, B.J.**, Reynolds, R.A., Koestner, D., Barbeau, K., and Stramski, D. (2020) "The Optical and Chemical Properties of Antarctic Glacial Meltwater". *In Prep*.
- **Pan, B.J.**, Vernet, M., Forsch, K., Manck, L., and Barbeau, K. (2020) "Nutrient Ratio and Phytoplankton Uptake Rate in nearshore Antarctic Waters." *In Prep*.
- Mascioni, M., Almandoz, G.O., Ekern, L., Pan, B.J., Vernet, M. (2020) "Microplanktonic diatom assemblages dominated the primary production in an Antarctic fjord." *Journal of Marine Systems*. *Submitted*.
- **Pan, B.**, and Moore, J.K. (2020) "Analysis of the Variations in Chlorophyll Concentration in the Vicinity of the Kerguelen Plateau." *In Prep*.
- **Pan, B.J.**, Vernet, M., Manck, L., Forsch, K., Ekern, L., Mascioni, M., Barbeau, K., Almandoz, G., and Orona, A.J. (2020) "Environmental Drivers of Phytoplankton Taxonomic Composition in an Antarctic Fjord." *Progress in Oceanography* 183: 102295. <https://doi.org/10.1016/j.pocean.2020.102295>.



- **Pan, B.J.**, Vernet, M., Reynolds, R.A., and Mitchell, B.G. (2019) “The optical and biological properties of glacial meltwater in an Antarctic fjord.” *PLoS ONE* 14(2): e0211107. <https://doi.org/10.1371/journal.pone.0211107>.
- Gierach, M., Holt, B., Trinh R., **Pan, B.**, and Rains, C. (2016) “Satellite Detection of Wastewater Diversion Plumes in Southern California.” *Estuarine, Coastal and Shelf Science* 186:171-82. <https://doi.org/10.1016/j.ecss.2016.10.012>.

Conference Proceedings

- **Pan, B.J.** (2020) “Glacial Discharge and its Impact on Phytoplankton Community Composition in a Western Antarctic Fjord and Continental Shelf.” SCAR 2020 Online. Poster.
- Vernet M., **Pan B.J.**, Forsch K., Manck L., Barbeau K. (2020). “The nitrate-to-dissolved-iron ratio in West Antarctica coastal waters.” SCAR 2020 Online. Talk.
- Mascioni, M., Almandoz G., Ekern L., **Pan B.J.**, and Vernet M. (2020). “Phytoplankton assemblages in an Antarctic fjord: composition, diversity and productivity.” SCAR 2020 Online. Talk.
- **Pan, B.J.**, Vernet, M., Manck, L., Forsch, K., Ekern, L., Mascioni, M., Barbeau, K., Almandoz, G.O., and Orona, A.J. (2020) “Glacial Discharge and its Impact on Phytoplankton Taxonomic Composition in an Antarctic Fjord.” AGU/ASLO Ocean Sciences Meeting, 2020. Talk.
- Vernet, M., Kozlowski, W.A., **Pan, B.J.**, Cusick, A., Mascioni, M., Garibotti, I.A. (2020) “Variability in Diatom Abundance and Diversity Determined by Sea Ice Dynamics.” AGU/ASLO Ocean Sciences Meeting, 2020. Poster.
- Weiss, E., Vernet, M., Cape, M.R., **Pan, B.J.**, Mitchell B.G. (2020) “The Distribution of Mycosporine-like Amino Acids in Phytoplankton Across a Southern Ocean Transect.” AGU/ASLO Ocean Sciences Meeting, 2020. Poster.
- **Pan, B.J.**, Vernet, M. (2018) “Small Phytoplankton Dominate Community Size Structure in an Antarctic Fjord.” SCAR, Polar 2018. Poster.
- **Pan, B.J.**, Vernet, M., and Barton A.B. (2018) “Coastal Phytoplankton Community in an Antarctic Fjord System.” UCSD FISP Symposium 2018. Poster.
- **Pan, B.J.**, Vernet, M. (2018) “The Optical Characteristics and Spatial Distribution of Meltwater in an Antarctic fjord, Andvord Bay.” AGU/ASLO Ocean Sciences Meeting, 2018. Poster.
- Forsch, K., Manck, L., Ekern, L., **Pan, B.J.**, Vernet, M., Barbeau, M. (2018) “Links Between Sources of Iron and Organic Iron-binding Ligands to the Supply of Cryospheric Iron to Coastal West Antarctic Peninsula.” AGU/ASLO Ocean Sciences Meeting, 2018. Poster.



- Ekern, L., Vernet, M., **Pan, B.J.**, Cape, M. (2018) "Assessing seasonal primary production via macronutrient deficits in a high latitude fjord system." AGU/ASLO Ocean Sciences Meeting, 2018. Poster.
- **Pan, B.J.**, Vernet, M., Reynolds, R. (2017) "The Optical Characteristics of Meltwater in an Antarctic Fjord, Andvord Bay." Gordon Search Conference/Seminar on Polar Marine Biology. Poster.
- **Pan, B.**, Rains, C., and Trinh, R. (2014) "Remote Sensing Detection of Wastewater Plumes to Assess Public Water Quality in Los Angeles and Orange Counties." Highlight Presentation. NASA Headquarter DEVELOP Program Showcase. Talk.
- **Pan, B.**, and Moore, J.K. (2014) "Analysis of the Variations in Phytoplankton Blooms in the Vicinity of Kerguelen Plateau." AGU Ocean Sciences Meeting. Talk.
- Norton, J., Nayebaziz, S., Burke, B., **Pan, B.**, and Tomlinson B. (2014) "Plant Guild Composer: An Interactive Online System to Support Back Yard Food Production." CHI Conference. Talk.
- **Pan, B.**, and D. Pataki (2011) "*The influence of N source and fertilizer application on growth of a tropical pitcher plant, Nepenthes sanguinea.*" UROP Symposium. Talk.
- **Pan, B.**, C. Goedhart, and D. Pataki (2010) "*The linkage between native habitat and plant water use in acacia species.*" UROP Symposium. Talk.

Non-Refereed Publications

- Traverso, M. Boarman, R., and **Pan, B.** (2013) "Synthetic Aperture Radar Data Decision Support for Atlantic Bluefin Tuna Population Assessment and Management in the Gulf of Mexico." NASA DEVELOP Technical Report (internal).
- Pan, B., Miu, J. (2013) "Utilizing Ocean Iron Fertilization as a Climate Change Intervention Method: Science, Feasibility, and Economics." UCI Dept. of Earth System Science.
- Pan, B. (2013) "An Assessment of Artificial Ocean Iron Fertilization as a Climate Emergency Response and Intervention Program." UCI Dept. of Earth System Science.
- Pan, B. (2012) "The Effect of Iron Fertilization on Marine Primary Productivity: Cause of Global Temperature Change." UCI Dept. of Earth System Science.

Trainings

- Department of Energy, Energy I-Corps (2020)
- Larta Institute, Commercialization Assistance Program (CAP as part of DOE SBIR 2020)



- Clean Tech Open Accelerator (2020)
- VentureWell Program (2020)
- UCSD Rady School of Management, Micro-MBA Certificate (2017)
- Cornell University, **Satellite Remote Sensing** Training Program. Instructor: Bruce Monger (2016).
- NASA & University of Maine, **Calibration & Validation for Ocean Color Remote Sensing** (“the ocean optics summer course”); instructors (alphabetical): Emmanuel Boss (coordinator), Ivona Cetinic, Curt Mobley, Mary Jane Perry, Collin Roesler, Ken Voss, Jeremy Werdell. (Summer, 2015).

Research Deployments

- NSF RAPID Field Campaign (**to Eastern Antarctic Peninsula/Weddell Sea**) in collaboration with the Korea Polar Research Institute (KOPRI) on IBRV ARAON (03 – 05/2018)
- NSF FjordEco Field Campaign, Season 2 (**to Western Antarctic Peninsula**) on RVIB Palmer (03 – 05/2016)
- NSF FjordEco Field Campaign, Season 1 (**to Western Antarctic Peninsula**) on R/V Gould (11/2015 – 01/2016)
- SIO/UCSD Deep Sea Biology Cruise (**to Southern California Bight**) on R/V Sprout (Nov. 2015)
- NASA/UMaine Field Work Cruise, Optics & Satellite Ocean Color Validation (**to Maine Coastal Ocean**) on R/V Ira C. (Summer 2015)
- SIO/UCSD Biological Oceanography Cruise (**to Southern California Bight**) on R/V Sprout (Oct. 2014)

Outreach & Presentations

- Guest Speaker, “Small-Scale Ocean Energy & Big-Data Paradigm for Bluetech.” Department of Energy, Marine Energy Collegiate Competition (2021).
- Speaker, “Collaboration with Ocean Motion Technologies.” Norway Aquaculture B2B Program. U.S. Commercial Service, Department of Commerce (2021).
- Speaker/Panelist, “Big-data & Small-Scale MHK.” Session: Marine Hydrokinetic. BlueTech Week by TMA Bluetech (2020).



- Speaker/Panelist, "Big-data & Small-Scale Ocean Energy." Session: Offshore Ecosystem for Small-Medium Enterprises by TMA Bluetech (2020).
- Speaker/Panelist, "Introduction to Ocean Motion Technologies." Session: Enabling Technologies for Sustainable Energy. BlueTech Week by TMA Bluetech (2019).
- Speaker, "Instrumentation Application in the Polar Regions." Marine Technology Society Evening Lecture Series (2019).
- Speaker, Scripps Polar Center Inaugural All-Hands Seminar. "A Multidisciplinary Approach to Polar Ecosystems in a Changing Environment: An Overview" (2019).
- Participate, United Nations' COP 25 Conference (2019).
- Speaker/Panelist, "Blue Carbon or Marine Ecosystem Regeneration?" United Nations' COP 24 Conference (2018).
- @FjordPhyto on FjordEco research expedition, social media outreach (2015 & 2016)
- Scripps Open House, Polar research exhibit booth (2016)

Services

- Board of Directors, the Maritime Alliance (TMA BlueTech) (2021 – present)
- Board, Marine Technology Society (MTS) (2017 – present)
- Journal Reviewer: Deep Sea Research Part II
- Steering Committee, SIO Sandbox (formerly "H-Lab Makerspace") (2019)
- Mentor, Peer Mentor Program, SIO, UCSD (2017)
- Student Search Committee for Polar Science Faculty Candidate, SIO UCSD (2016)
- Coordinator, Biological Oceanography/Ecology Weekly Seminar Series (2015-2016)

Awards/Honors

- DOD Antarctica Service Medal (2016)
- DOE SBIR Phase II, P.I. (2021)
- DOE SBIR Phase I, P.I. (2020)
- DOE/POET TEAMER RFTS 2 (2021)
- DOE/POET TEAMER RFTS 1 (2020)
- Clean Tech Open, National Finalist (2020)



- CalSEED Award (2018)
- Herrider Family Fellowship (2019)
- UCSD Frontier of Innovation Scholarship Program (2017)
- Robert H. Kieckhefer Endowed Coastal Studies Fund (2017)
- The Casner Family Foundation Fellowship (2014 – 2015)
- Robert L. Cody Memorial Fellowship (2014 – 2015)
- Henry L. and Grace Doherty Fellowship (2014 – 2015)
- Alan and Nora Jaffe Fellowship (2014 – 2015)
- Krinsk Research Advancement Initiative (KRAI) (2014 – 2015)
- COSMOS College Access Scholarship (2009 – 2011)
- UCI UROP Research Fellowship (2011)
- UCI UROP Research Grant (2010)
- UCI SURP Research Fellowship (2010)
- California Nobel Laureate Dinner, UC Irvine COSMOS Rep. (2010)
- California Nobel Laureate Dinner, Presenter/COSMOS Alumni Rep. (2008)
- Dean's Honor's List, University of California, Irvine

Affiliations

- The Maritime Alliance (TMA BlueTech), Member (2017 – present)
 - Board of Directors (2021 – present)
 - Member, TMA BlueTech Incubator Program (2017 – present)
- Marine Technology Society (MTS), San Diego Chapter (2017 – present)
 - Board Member (2017 – present)
- Cleantech San Diego, Member (2016 – present)
 - Member, Southern California Energy Innovation Network (2019 – present)
- Scripps Corporate Alliance, Member (2021 – present)
- San Diego Entrepreneur Exchange (SDEE), Member (2017 – present)
- American Association for the Advancement of Science (AAAS), Member (2017 -- present)
- American Geophysical Union (AGU), Member (2013 -- present)
- The Oceanography Society (TOS), Member (2015 -- present)
- Association of Polar Early Career Scientists (APECS), Member (2016 – present)
- The American Polar Society, Member (2016 – present)
- Interdisciplinary Forum for Environmental Research, UCSD (2015 -- 2020)
- International Carnivorous Plant Society, Member (2012 -- present)
- UCI Earth System Science Club, Founder & President (2010 –2013)
- TEDxUCI, Co-founder & Director of Speaker Relations (2011 – 2013)
- UCI Sustainable Energy and Technology Club, Vice President external (2009 – 2013)
- COSMOS Connect, Co-President (2009 –2013)

Skills

Programming and Data Science

- Python, Tableau, Tableau Prep
- Basic knowledge in R, JavaScript, Matlab, IDL



Geospatial/Image Analysis

- SeaDAS, NEST 4C, VISAT/BEAM
- Google Earth; basic knowledge in Google Earth Engine
- Esri GIS: ArcMap, basic knowledge in QGIS
- Ocean Data View (ODV), Java Ocean Atlas (JOA)
- ENvironment for Visualizing Images (ENVI)
- Basic knowledge in ImageJ

Field-Specific Instruments

- Spectrophotometer
- Fluorometer
- FlowCam
- AC meters (AC-9 & ACS)
- Profiling radiometer (PRR, C-OPS, HyperSAS, HyperPro)
- CTD

Laboratory/Field Method

- Plankton Microscopy
- Marine life inventory, plankton tow
- Environmental variable/site analysis
- Stable isotopic sample processing & data analysis

Design & Office Operation

- Adobe (in order of proficiency): Lightroom, Photoshop, Premiere, InDesign, Audition, After Effects.
- Vyond for infographic cartoon animation
- Microsoft Office with basic knowledge in Access, iWork, and Prezi
- Teleconferencing (Zoom, Cisco, Gotomeeting, Skype)
- Proficiency in both Windows PC and Macintosh/Mac OS; Some knowledge in Linux
- Basics in IT support

Other

- Freelance Photography ([500px](#)) and basic cinematography
- Ability to work on collaborative and multidisciplinary projects
- Strong skills in visual presentation & verbal communication
- Social media outreach (targeted ads, engagement analytics)
- Indoor gardening and enclosed artificial ecosystem
- Fluency in Mandarin Chinese
- Basics in drone piloting