LAURENT MARCEL CHERUBIN

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Education/Employment History

Education

PhD, 2000 – Physical Oceanography, Université de la Méditerranée, France

MS, 1995 – Physical and Coastal Oceanography, Université de la Méditerranée, France

BS, 1993 – Solid and Fluid Mechanics, Université Bordeaux I, France

Employment history

2021 – present, Research Professor, Harbor Branch Oceanographic Institute, Florida Atlantic University, USA

2013 - 2021, Research Associate Professor, Harbor Branch Oceanographic Institute, Florida Atlantic University, USA

2012-2013, Adjunct Faculty, Miami-Dade College, USA

2011-2013, Associate Scientist, Rosenstiel School of Marine and Atmospheric Science, University of Miami, USA

2011, Visiting Scientist, University of the Virgin Islands, USA

2007 – 2009, Adjunct Faculty at SUNY Oswego, USA

2004 – 2010, Assistant Scientist, Rosenstiel School of Marine and Atmospheric Science, University of Miami, USA

2002-2003, Post-doctoral Associate, Rosenstiel School of Marine and Atmospheric Science, University of Miami, USA

2000-2001, Post-doctoral Associate, Faculdade de Ciências, Instituto de Oceanografia, Universidade de Lisboa, Portugal

Awards

Exceptional faculty, Northern Campus Awards, 2022, Florida Atlantic University

Scholarship/Research/Creative Activity

Publications in Print (last five years)

- Refereed Journal Articles (Graduate students, Undergraduate students)

Ali Salem Altaher, Hanqi Zhuang, Ali K. Ibrahim, Ali Muhamed Ali, Ahmed Altaher, James Locascio, Michael P. McCallister, Matthew J. Ajemian, Laurent M. Chérubin, 2023. Detection and localization of Goliath grouper using their low-frequency pulse sounds. The Journal of the Acoustical Society of America, 153 (4): 2190. https://doi.org/10.1121/10.0017804

Lombardo, S.M., **L.M. Chérubin**, A.J. Adams, J.M. Shenker, P.S. Wills, A.J. Danylchuk, and M.J. Ajemian, 2022. Biophysical larval dispersal models of observed bonefish (Albula vulpes) spawning events in Abaco, The Bahamas: An assessment of population connectivity and ocean dynamics. PLoS ONE 17(10): e0276528. https://doi.org/10.1371/journal. pone.0276528

Huang, Y, Y. Tang, X. Zhu, H. Zhuang and **L. Chérubin**, 2022. "Physics-Coupled Spatio-Temporal Active Learning for Dynamical Systems," in *IEEE Access*, vol. 10, pp. 112909-112920, doi: 10.1109/ACCESS.2022.3214544.

Muhamed Ali, H. Zhuang, A.K. Ibrahim, W.L. Wang, **L.M. Chérubin**, 2022. Deep learning prediction of two-dimensional ocean dynamics with wavelet-compressed data. Frontiers in Artificial Intelligence, 5, doi=10.3389/frai.2022.923932

Chérubin, L.M., and R.J. Burgman, 2022. Effects of climate change and water management on West Florida Shelf's dynamics. Bulletin of Marine Science, 98. https://doi.org/10.5343/bms.2021.0054

Ajemian, M.J. , C. Lamboy, Ali K. Ibrahim, B. DeGroot, K. Bassos-Hull, D. Mann, **L.M. Chérubin**, 2021. Capturing shell-crushing by large mobile predators using passive acoustics technology. Journal of Experimental Marine Biology and Ecology, 535, 151497. https://doi.org/10.1016/j.jembe.2020.151497. (published online on 12/17/2020)

Brewster, L.R., A.K. Ibrahim, B.C. DeGroot, T.J. Ostendorf, H. Zhuang, **L.M. Chérubin**, M.J. Ajemian, 2021. Classifying Goliath Grouper (*Epinephelus itajara*) Behaviors from a Novel, Multi-Sensor Tag. Sensors, 21, 6392. https://doi.org/ 10.3390/s21196392

Chérubin, L. M., N. Le Paih, & X. Carton, 2021. Submesoscale Instability in the Straits of Florida, Journal of Physical Oceanography (published online ahead of print 2021). https://doi.org/10.1175/JPO-D-20-0283.1

Huang, Y., Y. Tang, H. Zhuang, J. VanZwieten and **L. Chérubin**, 2021. Physics-Informed Tensor-Train ConvLSTM for Volumetric Velocity Forecasting of the Loop Current. Front. Artif. Intell. 4:780271. doi: 10.3389/frai.2021.780271

Ibrahim, A.K., H. Zhuang, **L.M. Chérubin**, N. Erdol, G. O'Corry-Crowe, and A. Muhamed Ali, 2021. A multimodel deep learning algorithm to detect North Atlantic right whale up-

calls. The Journal of the Acoustical Society of America 150, 1264-1272. https://doi.org/10.1121/10.0005898

Muhamed Ali, A., H. Zhuang, J. VanZwieten, A.K. Ibrahim, **L.M. Chérubin**, 2021. A Deep Learning Model for Forecasting Velocity Structures of the Loop Current System in the Gulf of Mexico. Forecasting, 3, 934–953. https://doi.org/10.3390/ forecast3040056

Wang, J.L., H. Zhuang, L.M. Chérubin, A. Muhamed Ali, A.K. Ibrahim, 2021. Loop Current SSH Forecasting: A New Domain Partitioning Approach for a Machine Learning Model. Forecasting, 3, 570–579. https://doi.org/10.3390/ forecast3030036

Ibrahim, Ali K., Hanqi Zhuang, **L.M. Chérubin**, Michelle T. Schärer Umpierre, Richard S. Nemeth, Nurgun Erdol and Ali Muhamed Ali, 2020. Transfer learning for grouper sound classification, Journal of the Acoustic Society of America, Express Letters, 148 (3), pp EL260–EL266, https://doi.org/10.1121/10.0001943

Chérubin, L.M., Fraser Dalgleish, Ali K. Ibrahim, Michelle Schärer-Umpierre, Richard S. Nemeth, Anthony Matthews, and Richard Appeldoorn, 2020. Fish Spawning Aggregations Dynamics as Inferred from a Novel, Persistent Presence Robotic Approach. Frontiers in Marine science, 6:779. doi: 10.3389/fmars.2019.00779

Criales, Maria M., **L. Chérubin**, Ryan Gandy, Lysel Garavelli, Mohamed A. Ghannami, Claire Crowley, 2019. Blue Crab Larval dispersal highlights population connectivity and implications for fishery management. Marine Ecology Progress Series, **625**, pp. 53-70. https://doi.org/10.3354/meps13049

Ibrahim, Ali K., Hanqi Zhuang, **L.M. Chérubin**, Michelle T. Schärer Umpierre, Ali Muhamed Ali, Richard S. Nemeth, and Nurgun Erdol, 2019. Classification of red hind grouper call types using random ensemble of stacked autoencoders. The Journal of the Acoustical Society of America, 146:4, 2155-2162. https://doi.org/10.1121/1.5126861

Wang, Justin L., Hanqi Zhuang, **L.M. Chérubin**, Ali K. Ibrahim, and Ali Muhamed Ali, 2019. Medium-Term Forecasting of Loop Current Eddy Cameron and Eddy Darwin Formations in the Gulf of Mexico with a Divide-and-Conquer Machine Learning Approach. Journal of Geophysical Research: Ocean, **124**, pp. 5586–5606. https://doi.org/10.1029/ 2019JC015172

Segura-García, Iris, Garavelli, Lysel, Tringali, Michael, Matthews, Thomas, **Chérubin, L. M.**, Hunt, John, & Box, Steven J., 2019. Reconstruction of larval origins based on genetic relatedness and biophysical modeling. Scientific Reports, **9**(1), 7100. doi:10.1038/s41598-019-43435-9

Garavelli Lysel, Studivan Michael S., Voss Joshua D., Kuba Alyson, Figueiredo Joana and **Chérubin LM**, 2018. Assessment of Mesophotic Coral Ecosystem Connectivity for Proposed Expansion of a Marine Sanctuary in the Northwest Gulf of Mexico: Larval Dynamics. Frontiers in Marine Science, 5:174. doi: 10.3389/fmars.2018.00174

Garavelli, Lysel, J. Wilson White, Iliana Chollett, **L.M. Chérubin**, 2018. Population models reveal unexpected patterns of local persistence despite widespread larval dispersal in

a highly exploited species. Conservation Letters, 11, e12567. https://doi.org/10.1111/conl.12567

Ibrahim, Ali K., Hanqi Zhuang, **L. M. Chérubin**, Michelle T. Schärer-Umpierre, Nurgun Erdol, 2018. Automatic classification of grouper species by their sounds using deep neural networks. The Journal of the Acoustical Society of America, 144, EL196, https://doi.org/10.1121/1.5054911

Ibrahim, Ali K., **L.M. Chérubin**, Hanqi Zhuang, Michelle T. Schärer Umpierre, Fraser Dalgleish, Nurgun Erdol, Bing Ouyang, and Anni Dalgleish, 2018. An approach for automatic classification of Grouper vocalizations with passive acoustic monitoring. *The Journal of the Acoustical Society of America*, **143**(2), pp. 666-676.

Chollett, Iliana., Garavelli, Lysel, Holstein, Daniel, **Chérubin, L.**, Fulton, Stuart and Box, Steven J., 2017. A case for redefining the boundaries of the Mesoamerican Reef Ecoregion. Coral Reefs, **36**, pp. 1039-1046. doi:10.1007/s00338-017-1595-4

- Book Chapter

Garavelli L, Studivan MS, Voss JD, Kuba A, Figueiredo J and Chérubin LM (2019) Assessment of Mesophotic Coral Ecosystem Connectivity for Proposed Expansion of a Marine Sanctuary in the Northwest Gulf of Mexico: Larval Dynamics., in "CORAL REEFS IN THE ANTHROPOCENE." iBooks. Sweet, M., Andradi-Brown, D. A., Voolstra, C. R., Head, C. E. I., Curnick, D., Frazer, T. K., Banaszak, A. T., eds. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88963-418-7

Grants (last five years)

External

- Funded
  - **Observation and modeling of transport and dispersion of waters and pollutants from south Florida watersheds to Florida Keys,** EPA, M. Jiang (PI), co-PI: L. Chérubin (40%), 01/01/2022 – 12/31/2023, $348,278.
  - **Next generation sensor systems for natural oceanic bioluminescence assessments,** ONR, M. Twardowski (PI), co-PIs: J. Sullivan, B. Ouyang, Timothy Moore, A. Nayak, M. McFarland, F. Dalgleish, G. Wang, and L. Chérubin (6%), 07/22/20 – 07/21/24, $11M.
  - **Development of Oyster Larvae Dispersal Models for Apalachicola Bay**, Laurent Chérubin (PI)(12.5%), Florida Fish and Wildlife Commission, 01/01/2020-12/01/2020, $100,000 (project aborted because it took one year to get a contract)
  - **Acquisition of a High-mix, Low-volume PCB Assembly System**, NSF MRI, Jason Hallstrom (PI), co-PIs: G. Alsenas, L. Chérubin (0%), B. Ouyang, D. Pados, 07/01/19 – 06/30/22, $233,329.
  - **Loop Current System SSH and subsurface current prediction with a transfer learning approach**, National Academy of Science, Engineering and Medicines,

L. Chérubin (PI)(12.5%), co PIs: H. Zhuang, J. van Zwieten, 10/22/18-1/31/19, $346,179

- **Unveiling the "grouper guard" - the first line of subtropical coastal defense to UUV's via integrated acoustic**, DARPA BTO, L. Chérubin (PI)(30%), co-PIs: M. Ajemian, F. Dalgleish, 01/01/19-12/31/22, $6,885,380
- **High resolution tidally-forced simulation of the Meso-American region with the Regional Oceanic Modeling system (ROMS)**, RARE Foundation, L. Chérubin (PI)(8.33%), 10/22/18-1/31/19, $32,750
- **Acquisition of Artificial Intelligence & Deep Learning (AIDL) Training and Research Laboratory**, NSF MRI, X, Zhu (PI), co-PIs: L. Chérubin (0%), H. Zhuang, D. Pados, T. Koshgoftaar, 10/1/18-9/30/21, $652,850
- **Larval Dispersal Models for Florida Coastal Waters**, Florida Fish and Wildlife Conservation Commission - Federal Flow Through, L. Chérubin (PI) (8%), 1/1/17-3/31/18, $69,895
- **Autonomous holographic imaging system for long term in situ studies of marine particle dynamics**, NSF OCE-1634053, J. Sullivan (PI), co-PIs: F. Dalgleish, L. Garavelli, A. Nayak, M. McFarland, Key personnel: L. Chérubin (8.33%), 9/15/16-9/14/19, $894,762
- **Evaluation of Larval Connectivity Patterns of M. cavernosa in the Flower Garden Banks**, NOAA CIOERT, L. Chérubin (PI)(8.33%), co-PIs: L. Garavelli, and J. Voss, 7/1/16-6/30/18, $61,357
- **Management of red hind (Epinephelus guttatus) spawning aggregations in the US Caribbean Islands**, NOAA Saltonstall-Kennedy, R. Nemeth UVI (PI), co-PIs: L. Chérubin (HBOI lead)(15%), M. Schärer Umpierre, R. Appeldoorn, 7/1/15 - 6/30/17, $400,000 (HBOI portion $148,241).
- **Advanced Glider Sensing Technologies for Innovative Studies at Coral Reef Ecosystems**, NOAA CIOERT, A. Dalgleish (PI), co-PIs: F. Dalgleish, L. Chérubin (15%), B. Ouyang, M. Twardowski, 07/01/14 – 6/30/19, $1,409,321.

Internal

- Funded
  - **Impacts of disturbance, disease, and environmental degradation on estuarine and oceanic wild Florida dolphins**, SLP PWD, G. O'Corry-Crowe (PI), co-PIs: L. Chérubin (10%), T. Mincer, A. Page-Karjian, 01/07/21 – 06/30/23, $490,977.
  - **Dolphin population assessment on the East Florida Shelf and habitat characterization**, SLP PWD, L. Chérubin (PI) (80%), co-PIs: G. O'Corry-Crowe, B. Ouyang, 01/07/21 – 06/30/23, $677,154.
  - **Using emerging technologies for population biology and behavioral ecology assessment of Florida whales**, SLP Protect Florida Whales, HBOIF, L. Chérubin (PI)(15%), co-PIs: G. O'Corry-Crowe, H. Zhuang, A. Page-Karjian, 7/1/20-06/33/22, $147,000
  - **Using emerging technologies for population biology and behavioral ecology assessment of Florida whales**, SLP Protect Florida Whales, HBOIF, G. O'Corry-Crowe (PI), co-PIs: L.M. Chérubin (8.33%), H. Zhuang, A. Page-Karjian, S. Burton, 1/1/19-12/31/19, $123,091
  - **Snap, crackle, pop: capturing mollusk predation with passive acoustics technology**, M. Ajemian (PI), co-PI: L. Chérubin (1%). SLP AQUA HBOIF seed grant, 7/1/17-6/30/18, $31,000

Courses Taught at FAU

- Courses taught and developed
  - OCE 4006, Marine Science, 4 credits
  - OCE 6097, Physical and Geological Oceanography, 3 credits
  - BSC 6936, Applied Methods in Fisheries Science**,** Non-Invasive Sampling Techniques, Fall 2019, 3 credits
- Supervision of Graduate Students
  - Carollanne Farmer, Charles E. Schmidt College of Science, May 2022, in progress.
  - Ryan Eckert, Charles E. Schmidt College of Science, PhD, Fall 2024, in progress.
  - Ali Altaher, College of Engineering and Computer Science, PhD, Fall 2023, Signals Classification by Artificial Intelligence, in progress.
  - Ali Muhamed Ali, FAU College of Engineering and Computer Science, PhD, Fall 2020, in progress.
  - Yu Huang, FAU College of Engineering and Computer Science, PhD, Fall 2022
  - Aaron Duecaster, Charles E. Schmidt College of Science, PhD, Fall 2021, Developing an Approach to Estimate Chlorophyll Concentration and Variance in the Indian River Lagoon, FL, Using Drone-Derived Multispectral Imagery, in progress.
  - Rachel Lynn Shaw, Charles E. Schmidt College of Science, MS, May 2020, Three-Dimensional Movement And Habitat Use Of Young White Sharks (Carcharodon Carcharias) In The Northwest Atlantic Ocean.
  - Ali k. Ibrahim, College of Engineering and Computer Science, PhD, December 2019, Multi-Model Deep Learning For Grouper Sound Classification And Seizure Prediction.
  - Abu Siddke, College of Engineering and Computer Science, MS, May 2018, Salinity Simulation in Florida Bay with the Regional Oceanic Modeling System (ROMS).
  - MD Ashan Habib, MS, College of Engineering and Computer Science, MS, May 2016, A Modeling Study On The Effects Of Seagrass Beds On The Hydrodynamics In The Indian River Lagoon.

- Advising Activities
  - Summer interns
    - Undergraduates
      - Morgan Kelly, 2019, 2020, Fox Lane High School
      - Shannon Babcock, George Washington University, HBOI intern summer program
      - Mohamed Ali Ghannami, 2017, ENSTA Bretagne, Brest, France
      - Mary Burnam, 2017, University of Georgia, NSF REU intern summer program

- Richard Peterson, 2017, Northern Arizona University, NSF REU intern summer program
- Karly Ulfsax, 2016, University North Carolina Wilmington, HBOI intern summer program
- Pauline Tedesco, 2015, Aix-Marseille Université, France
- Bertrand Lequeux, 2014, Universidad del Mar, Mexico
- Shekhar Suman, 2014, Indian Institute of Management, Jaipur, India, HBOI intern summer program

▪ Graduates

- Nicolas Le Paih, MS, 2016, Université de Bretagne Occidentale, Brest France
- Mahdi Esfahanian, PhD, 2015, FAU, HBOI intern summer program

Service and Professional Development

Service to the Institution

- Department/School service
  - Chair of the HBOI Faculty Assembly (2016-2017)
  - Vice chair of the HBOI Faculty Assembly (2015-2016)
  - HBOI Research Committee, Personnel Committee, and Education Committee (2016 – present)
  - HBOI Foundation Faculty incentive Committee (2013 – 2018)

- College Service
  - Quantitative Ecologist Search Committee, HBOI and College of Science (2019-2020)
  - Marine Geologist Search Committee, College of science (2018 – 2019)
- University service
  - Research Council, Division of Research, 08/2020 - present
  - HBOI Executive Director Search Committee (2017)
  - HBOI representative at the Organization of Biological Field Stations, National Association Of Marine Laboratories, September 20-24, 2014, Marine Biological Laboratories, Woods Hole, MA

Service to the discipline/Profession

- Associated editor of the *Bulletin of Marine Science*
- Refereed journals reviewer: Applied Mathematical Modelling, Continental Shelf Research, Coral Reefs, Deep-Sea research, Dynamics of Atmosphere and Oceans Geophysical and Research Letters, Geophysical & Astrophysical Fluid Dynamics, Journal of Atmospheric and Oceanic Technology, Journal of Geophysical Research, Journal of Marine Systems, Ocean Modelling.

- Proposal reviewer: NSF OCE, BIO OCE, NOAA OAR
- NSF Coastal SEAS panel reviewer – 1-3 February 2016

Service to the Community/Public

- Member of the CFMC/WECAFC/OSPESCA/CRFM Working Group on Spawning Aggregations
- Member of the Scientific and Statistical Committee (SSC) South Atlantic Ecopath Model Review Working Group
- Member of the South Atlantic Fisheries Management Council Advisory Panel, 09/15-present