

# BEATRICE TOMASI

Nationality: Italian

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## RESEARCH INTERESTS

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Marine Technology  
Underwater wireless communications  
Internet of things  
Machine Learning Algorithms and Computational Complexity

## LANGUAGES

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Italian (Native) - English (C1) - French (B2) - Norwegian (A1)

## EDUCATION

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| Ph.D. in Information Science and Technology<br>University of Padua, Padua, Italy | 2012 |
| M.S., Telecommunication Engineering<br>University of Padua, Padua, Italy         | 2008 |
| B.S., Information Engineering<br>University of Padua, Padua, Italy               | 2006 |

## RESEARCH EXPERIENCE

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| NORCE Norwegian Research Centre AS<br><i>Senior Scientist</i><br>· Leader: I. Henne                                  | 08/2022 - present<br><i>Bergen, Norway</i>               |
| Higher Institute for Electronics and Digital Training (ISEN)<br><i>Lecturer-researcher</i><br>· Leader: P.-J. Bouvet | 09/2020 - 08/2022<br><i>Brest, France</i>                |
| University of Bergen<br><i>Assistant Professor II</i><br>· Leader: R. B. Pedersen                                    | 01/2019 - 09/2020<br><i>Bergen, Norway</i>               |
| NATO STO CMRE<br><i>Visiting Researcher</i><br>· Manager: K. Pelekanakis   | 05/2019 - 07/2019<br><i>La Spezia, Italy</i>             |
| Norwegian Research Center (NORCE)<br><i>Senior Scientist</i><br>· Manager: K. Marvik                                 | 08/2018 - 09/2020<br><i>Bergen, Norway</i>               |
| Huawei Technologies<br><i>Senior Research Engineer</i><br>· Manager: I. Land   | 12/2014 - 05/2018<br><i>Boulogne-Billancourt, France</i> |
| Woods Hole Oceanographic Institution (WHOI)<br><i>Postdoctoral Fellow</i><br>· Dir.: J. C. Preisig                   | 02/2013 - 11/2014<br><i>Woods Hole, MA, USA</i>          |

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| University of Padua<br><i>Postdoctoral Scholar</i><br>· Dir.: M. Zorzi                              | 01/2012 - 01/2013<br><i>Padua, Italy</i>     |
| NATO Undersea Research Center (NURC)<br><i>Visiting Research Fellow</i><br>· Supervised by K. McCoy | 05/2009 - 09/2009<br><i>La Spezia, Italy</i> |

## SKILLS

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| Computer Languages | Matlab, R, Python, Java, Bash                              |
| Instrumentation    | underwater modems, underwater ROVs, ocean sensors          |
| Experimental       | Underwater communications performance field tests          |
| Modeling           | Analytical and numerical modeling of communication systems |

## TEACHING EXPERIENCE

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| Lecturer for <i>Probabilities and statistics</i><br><i>Higher Institute for Electronics and Digital Training (ISEN)</i>  | 2020-2022 |
| Lecturer for <i>Mathematics III</i><br><i>Higher Institute for Electronics and Digital Training (ISEN)</i>   | 2020-2022 |
| Teaching assistant for <i>Digital communications</i><br><i>Higher Institute for Electronics and Digital Training (ISEN)</i><br>Prof: P.-J. Bouvet  | 2021-2022 |
| Teaching assistant for <i>Big Data</i><br><i>Higher Institute for Electronics and Digital Training (ISEN)</i><br>Prof: M. Saumard  | 2020-2022 |
| Lecturer for <i>Underwater Sensor Networks</i><br><i>Higher Institute for Electronics and Digital Training (ISEN)</i>  | 2021-2022 |
| Teaching Assistant for <i>Telecommunications</i><br><i>Department of Information Engineering, University of Padua</i><br>Prof: Leonardo Badia  | 2012      |
| Teaching Assistant for <i>Laboratory of networks and protocols for telecommunications 2010</i><br><i>Department of Information Engineering, University of Padua</i><br>Prof: Michele Zorzi |           |
| Teaching Assistant for <i>Mathematics: Calculus I</i><br><i>Department of Industrial Engineering, University of Padua</i><br>Prof: Andrea D'Agnolo   | 2008      |
| Teaching Assistant for <i>Fundamentals of Informatics</i><br><i>University of Padua</i><br>Prof: Federico Avanzini   | 2007      |

## SYNERGETIC ACTIVITIES

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|---|----------------|
| Nordic Seas responsible for <i>EMSO Engineering and Logistics Service Group</i> | 2020-present   |
| Chair of Master Program 'Marine Technologies' at ISEN                           | 2020-2022      |
| Primary convener of <i>IEEE/MTS Oceans, Section IV Autonomous Vehicles</i>      | 2021           |
| Associate Editor for <i>the Journal of Acoustic Society of America</i>          | 2020-present   |
| Co-advisor ISEN, LABSTIC PhD Thesis PENDUIC                                     | 2020-2022      |
| Expert (Remote Evaluator) for <i>European Commission EIC Accelerator</i>        | 2021 2019-2022 |

## HONORS AND AWARDS

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| Huawei Future Star   | <i>2015</i> |
| ONR Postdoctoral Fellowship - <i>2 years</i>   | <i>2013</i> |
| Outstanding reviewer for <i>IEEE Journal of Oceanic Engineering</i>                        | <i>2012</i> |
| Italian Ministry of University and Research Postdoctoral Fellowship (MIUR) - <i>1 year</i> | <i>2012</i> |
| “Aldo Gini” Foundation Research Fellowship - <i>6 months</i>                               | <i>2011</i> |
| NURC Research Fellowship - <i>3 months</i>   | <i>2009</i> |
| Italian Ministry of University and Research Ph.D. Fellowship (MIUR) - <i>3 years</i>       | <i>2009</i> |
| Toni Mian Prize for best M.Sc. Thesis  | <i>2008</i> |
| Carlo Bocchi Prize for merits during high school   | <i>2003</i> |

## FIELD EXPERIENCE AND RESEARCH CRUISE

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| SFI Smart Ocean, Austevoll IMR facility shore lab, tested and evaluated underwater acoustic channel sounding                         | <i>2022</i> |
| CommsNet12, scientist aboard the Alliance, tested and evaluated routing protocols in an underwater acoustic sensor network           | <i>2012</i> |
| KAM11, science party aboard the Kilo Moana, tested adaptive modulation techniques in a bidirectional underwater acoustic link        | <i>2011</i> |
| SubNet09, science party in the shore lab in Pianosa, experiment design and data collection of underwater acoustic channel statistics | <i>2009</i> |

## CAREER BREAKS

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| Parental leave (15 months) | <i>04/2017-08/2018</i> |
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## FUNDED PROJECTS

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|---|--------------------|
| [P4] UNDINA, as project coordinator, NFR, ERA-NET Cofund, MarTERA 2020 call <i>2021-2024</i> .                                  |                    |
| [P3] Center for Integrated Deep Sea Research, as work package leader on WP5 Innovation and Technology TMS Foundation Award 2020 | <i>2021-2024</i> . |
| [P2] TNA CSI-ACQUA, as project coordinator, EU Marine Robotics 2019 call  | <i>2020-2021</i> . |
| [P1] NorEMSO, as WP4 co-leader, NFR, Infrastructure 2018 call   | <i>2019-2027</i> . |

## JOURNAL PUBLICATIONS

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- [J5] Christophe Bernard, Pierre-Jean Bouvet & Beatrice Tomasi, Spread Spectrum Modulation with Grassmannian Constellations for Mobile Multiple Access Underwater Acoustic Channels, *MDPI Sensors*, 2022, 8518, doi.org/10.3390/s22218518.
- [J4] Beatrice Tomasi & James C. Preisig, Energy-Efficient Transmission Strategies for Delay Constrained Traffic With Limited Feedback, *IEEE Transactions on Wireless Communications*, vol. 14, no.3, pp.1369-1379, March 2015.
- [J3] Beatrice Tomasi, Daniele Munaretto, James Preisig and Michele Zorzi, Redundancy allocation in time-varying channels with long propagation delays, *Ad Hoc Networks*, 2015.
- [J2] Beatrice Tomasi, Paolo Casari, Leonardo Badia and Michele Zorzi, Cross-layer analysis via Markov models of incremental redundancy hybrid ARQ over underwater acoustic channels, *Ad Hoc Networks*, 2014.
- [J1] Beatrice Tomasi, Giovanni Toso, Paolo Casari and Michele Zorzi, On the Impact of Time-varying Underwater Acoustic Channels on the Performance of Routing Protocols, *IEEE Journal on Oceanic Engineering*, vol.38, no.4, pp.772-784, October 2013.

## PATENTS

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- [P5] EP-3529960-A1, Pilot sequence generator and corresponding method and channel estimator and corresponding method, Huawei Technologies Co., Ltd., Nassar KSAIRI, Merouane Debbah, Beatrice TOMASI, Published: 2019-08-28
- [P4] US-2018337758-A1, Systems And Methods For Scheduling Of Resources And Pilot Patterns To User Terminals In A Multi-User Wireless Network, Huawei Technologies Co., Ltd., Nassar KSAIRI, Stefano Tomasin, Beatrice TOMASI, Published: 2018-11-22
- [P3] US-10924251-B2, Encoding device and method and corresponding decoding device and method, Huawei Technologies Co., Ltd., Beatrice TOMASI, Frederic GABRY, Valerio BIOGLIO, Ingmar LAND, Jean-Claude Belfiore, Gaoning He, granted on 2021-02-16
- [P2] WO-2017020930-A1, A wireless communication device and method for RF energy harvesting, Huawei Technologies Co., Ltd., Afef Feki, Kamel TOURKI, Moez DRAIEF, Beatrice TOMASI, Filled: 2015-07-31, Published: 2017-02-09
- [P1] US-10340984-B2, Simultaneous information and power transfer "Huawei Technologies Co., Ltd.", "Beatrice TOMASI, Marco MASO, Marios Kountouris, Moez", granted on 2019-07-02

## PAPERS IN PROCEEDINGS OF CONFERENCES

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- [C28] A. Pottier, B. Tomasi, Online adaptive power allocation and channel state feedback strategies in underwater acoustic networks, in *Proc. of MTS/IEEE OCEANS*, 2021, Virtual.
- [C27] R. Garin, PJ Bouvet, P. Forjonel, B. Tomasi, C. Vanwysberghe, Simultaneous underwater acoustic localization and communication: an experimental study, in *Proc. of MTS/IEEE OCEANS*, 2021, Virtual.
- [C26] PJ Bouvet, P. Forjonel, B. Tomasi, Y. Auffret, M. Daniel, P. Simon, Y. Amirat, G. Feld, Contactless data transfer for autonomous underwater vehicle docking station, in *Proc. of MTS/IEEE OCEANS*, 2021, Virtual.
- [C25] Beatrice Tomasi, James C. Preisig, Evaluating Energy-Efficient Schedulers on Underwater Acoustic Data, in *Proc. of MTS/IEEE OCEANS*, Marseille, 2019.

- [C24] Beatrice Tomasi, Frédéric Gabry, Valerio Bioglio, Ingmar Land, Jean-Claude Belfiore, Low-complexity Receiver for Multi-Level Polar Coded Modulation in Non-Orthogonal Multiple Access, in *Proc. of Wireless Communications and Networking Conference Workshops (WCNCW)*, San Francisco, USA, 2017.
- [C23] Beatrice Tomasi, Alexis Decurninge and Maxime Guillaud, SNOOPS: Short Non-Orthogonal Pilot Sequences for Downlink Channel State Estimation in FDD Massive MIMO, in *Proc. of Globecom (Workshop 5G-RAN)*, Dec., 2016.
- [C22] Nassar Ksairi, Beatrice Tomasi and Stefano Tomasin, Pilot Pattern Adaptation for 5G MU-MIMO Wireless Communications, in *Proc. of SPAWC*, June, 2016
- [C21] Rachele Machado, Beatrice Tomasi, Hartmut Hafermann and Stefano Tomasin, Design of MLSD Based Receivers for Short-Range Optical, in *Proc. of SPAWC*, June, 2016
- [C20] Beatrice Tomasi and Maxime Guillaud, Pilot Length Optimization for Spatially Correlated Multi-User MIMO Channel Estimation, in *Proc. of Asilomar Conference on Signals, Systems and Computers*, Pacific Grove, CA, November 8-11, 2015.
- [C19] Beatrice Tomasi and James Preisig, Heuristic Scheduling for Efficient Underwater Communications with Limited Feedback Capabilities, in *Proc. of 2014 Underwater Communications and Networking (UComms)*, Sestri Levante, Italy.
- [C18] Beatrice Tomasi and Heather Furey, Real-time detection and classification of oceanographic events in underwater sensor networks, (POSTER) in *Proc. of Ocean Sciences Meeting*, Honolulu, HI, USA, Feb. 2014.
- [C17] Beatrice Tomasi and James C. Preisig, Energy efficient transmission policies in non-stationary underwater acoustic channels, in *Proc. of ASA meeting*, San Francisco, 2013.
- [C16] Beatrice Tomasi and James C. Preisig, Energy efficient transmission scheduling for non-stationary underwater acoustic channels, (POSTER), in *Proc. of ACM WUWNet*, Kaohsiung, Taiwan, Nov. 2013.
- [C15] Beatrice Tomasi, Daniele Munaretto, James C. Preisig and Michele Zorzi, Real-time Redundancy Allocation for Time-Varying Underwater Acoustic Channels, in *Proc. of ACM WUWNet*, Los Angeles, US, 4-5 Nov. 2012.
- [C14] Beatrice Tomasi, James C. Preisig and Michele Zorzi, On the spatial correlation in shallow water and its impact on networking protocols, in *Proc. of MTS/IEEE OCEANS*, Yeosu, Korea, 21-24 May 2012.
- [C13] Davide Zennaro, Beatrice Tomasi, Lorenzo Vangelista and Michele Zorzi, Light-Sync: a low overhead synchronization algorithm for underwater acoustic networks, in *Proc. of MTS/IEEE OCEANS*, Yeosu, Korea, 21-24 May 2012.
- [C12] Beatrice Tomasi, James C. Preisig and Michele Zorzi, On the Predictability of Underwater Acoustic Communications Performance: the KAM11 Data Set as a Case Study, in *Proc. of ACM WUWNet*, Seattle, USA, Dec. 2011.
- [C11] Beatrice Tomasi, Laura Toni, Paolo Casari, James C. Preisig and Michele Zorzi, A Study on the SPIHT Image Coding Technique for Underwater Acoustic Communications, in *Proc. of ACM WUWNet*, Seattle, USA, Dec. 2011.
- [C10] Nicolo Michelusi, Beatrice Tomasi, Urbashi Mitra, James C. Preisig, and Michele Zorzi, An Evaluation of the Hybrid Sparse-Diffuse Algorithm for Underwater Acoustic Channel Estimation, in *Proc. of MTS/IEEE OCEANS*, Kona, USA, Sep. 2011.

- [C9] Paolo Casari, Beatrice Tomasi, Konstantinos Pelekanikis, Mandar Chitre and Michele Zorzi, Performance Evaluation of SNR Prediction Schemes in Acoustic Communication Systems using Variable-Rate Modulation, in *Proc. of Underwater Acoustic Measurement (UAM)*, Kos, Greece, Jun. 2011.
- [C8] Beatrice Tomasi, James C. Preisig and Michele Zorzi, A Study on the Wide-Sense Stationarity of the Underwater Acoustic Channel for Coherent Communication Systems, in *Proc. of Underwater Acoustic Measurement (UAM)*, Kos, Greece, Jun. 2011.
- [C7] Beatrice Tomasi, James C. Preisig, Grant B. Deane and Michele Zorzi, A Study on the Wide- Sense Stationarity of the Underwater Acoustic Channel for Non-coherent Communication Systems, in *Proc. of IEEE European Wireless Communications*, Vienna, Austria, Apr. 2011.
- [C6] Beatrice Tomasi, Giovanni Zappa, Kim McCoy, Paolo Casari and Michele Zorzi, Experimental Study of the Acoustic Channel Time-Correlation for Under- water Communications, in *Proc. of MTS/IEEE OCEANS*, Sydney, Australia, May 2010.
- [C5] Kim McCoy, Beatrice Tomasi and Giovanni Zappa, JANUS: the genesis, propagation and use of an underwater standard, in *Proc. of ECUA*, Istanbul 5-9 July, Turkey, 2010.
- [C4] Beatrice Tomasi, Paolo Casari, Lorenzo Finesso, Giovanni Zappa, Kim McCoy and Michele Zorzi, Underwater Acoustic Channel Modeling using Markov and Hidden Markov Models, in *Proc. of IEEE MILCOM*, San Jose, CA, (USA), Oct. 2010.
- [C3] Beatrice Tomasi, Laura Toni, Paolo Casari, Lorenzo Rossi and Michele Zorzi, Performance Study of Variable-Rate Modulation for Underwater Communications based on Experimental Data, in *Proc. of MTS/IEE OCEANS*, Seattle, Washington, Sept. 2010.
- [C2] Beatrice Tomasi, Paolo Casari, Leonardo Badia and Michele Zorzi, A Study of Incremental Redundancy Hybrid ARQ over Markov Channel Models Derived from Experimental Data, in *Proc. of ACM WUWNet*, Woods Hole, Massachusetts, Oct. 2010.
- [C1] Paolo Casari, Beatrice Tomasi and Michele Zorzi, A comparison between the Tone-Lohi and Slotted FAMA MAC protocols for underwater networks, in *OCEANS*, Sept. 2008.