# Dr.-Ing. habil. Miguel Heredia Conde

## Main Research Areas

- Computer vision and computational imaging
- 3D imaging, e.g., correlation-based ranging: Photonic Mixer Device (PMD) and related technologies
- Signal processing, with focus on compressive sensing and sparse signal processing
- Medical imaging and physiological signal processing and inference
- 3D SLAM, and visual-based localization in mobile robotics

## Employment History

| | | |
|---|---|---|
| Oct. 2016 to present time | Postdoctoral researcher | University of Siegen, Siegen, DE |
| Apr. 2013 to Sep. 2016 | Research assistant | University of Siegen, Siegen, DE |
| Nov. 2012 to Mar. 2013 | Research assistant | University of Vigo, Vigo, ES |
| Nov. 2010 to Dec. 2010 | Freelance Eng. consultant | PSA Peugeot – Citroën, Vigo, ES |
| Jun. 2010 to Sep. 2010 | Freelance Eng. consultant | PSA Peugeot – Citroën, Vigo, ES |

## Academic Education

| | | |
|---|---|---|
| Nov. 2016 to Dec. 2022 | Habilitation in Electronic Eng. | University of Siegen, Siegen, DE |
| Apr. 2013 to Nov. 2016 | PhD in Electronic Eng. | University of Siegen, Siegen, DE |
| Sep. 2011 to Aug. 2012 | Industrial Engineering (thesis only, as exchange student) | University of Freiburg, Freiburg, DE |
| Sep. 2006 to Jun. 2011 | Industrial Engineering. Special. in Automation and Electronics | University of Vigo, Vigo, ES |

| **Languages:** | Galician | Spanish | English | German | French |
|---|---|---|---|---|---|
| Level: | C2 (Native) | C2 (Native) | C1 | C1 | A1 |

## Lectures

| | | | |
|---|---|---|---|
| 2017 to present time | 3 ECTS / year | Introduction to Compressive Sensing (Lecture) | University of Siegen, Siegen, DE |
| 2017 to present time | 3 ECTS / year | Introduction to Compressive Sensing (Exercises) | University of Siegen, Siegen, DE |
| 2017 to present time | 3 ECTS / year | Selected Ingredients for Compressive Sensing (Lecture) | University of Siegen, Siegen, DE |
| 2017 to present time | 3 ECTS / year | Selected Ingredients for Compressive Sensing (Exercises) | University of Siegen, Siegen, DE |
| 2019 to present time | ½ ECTS / year | Recent Advances in Machine Learning (Lecture) | University of Siegen, Siegen, DE |
| 2019 to present time | ½ ECTS / year | Recent Advances in Machine Learning (Exercises) | University of Siegen, Siegen, DE |
| 2021 | 32h | Introduction to Compressive Sensing | Nanjing University of Aeronautics and Astronautics (NUAA), Nanjing, CN |

heredia@zess.uni-siegen.de

# Dr.-Ing. habil Miguel Heredia Conde

## Research Stays

| | | |
|---|---|---|
| Feb. 2019 to Feb. 2020 | Department of Electrical and Electronic Engineering | Imperial College London, London, UK |
| Oct. 2018 | Faculty of Physics (Div. of Information Optics) | University of Warsaw, Warsaw, PL |
| Jun. 2017 | CiTIUS (Area of Artificial Vision) | University of Santiago de Compostela, Santiago de Compostela, ES |

## Teaching Stays

| | | |
|---|---|---|
| Feb. 2020 to April 2020 | Department of Applied Mathematics I (DMA I) | University of Vigo, Vigo, ES |

## Other Activities

| | | |
|---|---|---|
| Ongoing | Co-organizer and TCP Member of the CoSeRa 2024 conference | University of Santiago de Compostela, Santiago de Compostela, ES |
| Sep. 2023 to Sep. 2025 | Short-term foreign expert | NUAA, Nanjing, CN |
| Jun. 2023 to present time | Industrial collaboration with IGI - Integrated Geospatial Innovations GmbH | University of Siegen, Siegen, DE |
| Jun. 2023 | Session chair at ISCS 2023 | University of Luxembourg, Luxembourg, LU |
| Jul. 2020 to present time | Representative of Young Academics at ZESS | University of Siegen, Siegen, DE |
| Jan. 2020 to present time | General Manager of the H2020-MSCA-ITN "MENELAOS_NT" | University of Siegen, Siegen, DE |
| Dec. 2016 to present time | Leader of the cooperation ZESS-pmdtechnologies ag | University of Siegen, Siegen, DE |
| Sep. 2018 | Member of the Organization Team and session chair at the CoSeRa 2018 conference | University of Siegen, Siegen, DE |
| Sep. 2009 to Sep. 2011 | Volunteer for supporting incoming foreign students | University of Vigo, Vigo, ES |
| Nov. 2009 to Mar. 2010 | Staff of the 10th Tech. Employment Forum | University of Vigo, Vigo, ES |

Regular reviewer of top-level conferences (ICASSP, ISCAS, etc.), Elsevier and IEEE Transactions, Letters, and Journals. Reviewer of the DFG (German Research Foundation). Organizer of multiple research fori, summer schools, and outreach activities (e.g., under the UNESCO's "International Day of Light" and the MSCA's "European Researchers' Night"). Invited talks and seminars given, e.g., at CiTIUS (Santiago de Compostela, ES) in 2017, at the University of Warsaw (Warsaw, PL) in 2018, and at IWISS 2022, Shizuoka University (Hamamatsu, JP).

## Memberships

- Member of the IEEE, IEEE-SPS, and VDE-ITG professional societies

heredia@zess.uni-siegen.de

# Dr.-Ing. habil Miguel Heredia Conde

- Member of the NRW Center for Sensor Systems (ZESS)
- Member of the USC Singular Research Center for Intelligent Technologies (CiTIUS)
- Member of the DFG Research Training Group 1564 "Imaging New Modalities" (until closing in 2018)

## Awards and Funding

- 2023: NUAA Short-term foreign expert. Collaboration on "CS based Inverse Synthetic Aperture Radar (ISAR) Imaging". Funding: RMB 102,000.

- 2023: DFG Project "All-Optical Off-Pixel Resonant Demodulation for Very-High-Resolution Time-of-Flight Imaging", in collaboration with Dr. Shanshan Gu-Stoppel (Fraunhofer ISIT). Funding: € 519,293.
- 2023: DFG Project "1-Bit 3-Dimensional Imaging", in collaboration with Prof. Bhaskar Choubey (University of Siegen). Funding: € 721,000.
- 2020: Best Paper Award at the IEEE International Conference on Computational Photography (ICCP).
- 2019: UK Intelligence Community (IC) Postdoctoral Research Fellowship. Awarded by the UK Government Office for Science to outstanding early career science or engineering researchers. Funding: £200,000. Declined by the awardee.
- 2019: H2020 Marie Skłodowska Curie Action – European Training Network (MSCA-ETN) "MENELAOS_NT" (General Manager and scientific advisor). Awarded by the European Commission. Funding: €3,660,332.76.
- 2017: University of Siegen Prize for International Young Academics 2017, for the excellent performance in the frame of his doctoral thesis.
- 2006: University of Santiago de Compostela [USC, Spain] Award, under the program "A Ponte entre o Ensino Medio e a USC", for the excellent academic results during the Baccalaureate and the University Access.
- 2006: Academic Excellence Award. Awarded by the Government [Xunta de Galicia, Spain].

## References and further Information

References are available on request.

Further information: https://www.uni-siegen.de/zess/ese.home/personen/conde.html
Google Scholar: https://scholar.google.com/citations?user=eYEtL0sAAAAJ
ORCID: 0000-0001-5218-0822

heredia@zess.uni-siegen.de

# Dr.-Ing. habil Miguel Heredia Conde

## Publication List (10 most relevant publications, by year of appearance)[1]:

[1] F. Ahmed, M. Heredia Conde, P. López Martínez, T. Kerstein and B. Buxbaum, "Pseudo-Passive Time-of-Flight Imaging: Simultaneous Illumination, Communication, and 3D Sensing." In: *IEEE Sensors Journal*, vol. 22, no. 21, pp. 21218-21231, 1 Nov.1, 2022. DOI: 10.1109/JSEN.2022.3208085. URL: https://doi.org/10.1109/JSEN.2022.3208085.

[2] M. Heredia Conde, T. Kerstein, B. Buxbaum and O. Loffeld. "Near-Infrared, Depth, Material: Towards a Trimodal Time-of-Flight Camera". In: *IEEE Sensors Journal*, vol. 22, no. 12, June 2022, pp. 11271-11279. DOI: 10.1109/JSEN.2021.3076965. URL: https://doi.org/10.1109/JSEN.2021.3076965.

[3] A. Bhandari, M. Heredia Conde and O. Loffeld, "One-Bit Time-Resolved Imaging". In *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 42, no. 7, July 2020, pp. 1630-1641. ISSN: 0162-8828. DOI: 10.1109/TPAMI.2020.2986950. URL: https://doi.org/10.1109/TPAMI.2020.2986950.

[4] M. Heredia Conde, K. Kagawa, T. Kokado, S. Kawahito and O. Loffeld. "Single-Shot Real-Time Multiple-Path Time-of-Flight Depth Imaging for Multi-Aperture and Macro-Pixel Sensors". In: *45th International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, May 2020, pp. 1469-1473. DOI: 10.1109/ICASSP40776.2020.9054565. URL: https://doi.org/10.1109/ICASSP40776.2020.9054565.

[5] D.A. Hage, M. Heredia Conde and O. Loffeld. "Sparse Signal Recovery via Kalman-Filter-Based $\ell_1$ Minimization". In: *Signal Processing*, 171, January 2020, pp. 107487. ISSN: 0165-1684. DOI: 10.1016/j.sigpro.2020.107487. URL: https://doi.org/10.1016/j.sigpro.2020.107487.

[6] M. Heredia Conde, A. Bhandari and O. Loffeld. "Nonuniform Sampling of Echoes of Light". In: *13th International Conference on Sampling Theory & Applications (SampTA)*, July 2019. URL: https://sampta2019.sciencesconf.org/267691/document.

[7] M. Heredia Conde and O. Loffeld. "From L1 Minimization to Entropy Minimization: A Novel Approach for Sparse Signal Recovery in Compressive Sensing". In: *26th European Signal Processing Conference (EUSIPCO 2018)*, September 2018, pp. 573-577. DOI: 10.23919/EUSIPCO.2018.8553245. URL: https://doi.org/10.23919/EUSIPCO.2018.8553245.

[8] M. Heredia Conde, D. Shahlaei, V. Blanz and O. Loffeld. "Efficient and Robust Inverse Lighting of a Single Face Image Using Compressive Sensing". In: *The IEEE International Conference on Computer Vision (ICCV) Workshops*, December 2015, pp. 226-234. DOI: 10.1109/ICCVW.2015.38. URL: https://doi.org/10.1109/ICCVW.2015.38.

[9] M. Heredia Conde, K. Hartmann and O. Loffeld. "Structure and Rank Awareness for Error and Data Flow Reduction in Phase-Shift-Based ToF Imaging Systems Using Compressive Sensing". In: *3rd International Workshop on Compressed Sensing Theory and its Applications to Radar, Sonar and Remote Sensing (CoSeRa)*, June 2015, pp. 144-148. DOI: 10.1109/CoSeRa.2015.7330281. URL: https://doi.org/10.1109/CoSeRa.2015.7330281.

[10] M. Heredia Conde, K. Hartmann and O. Loffeld. "A Compressed Sensing Framework for Accurate and Robust Waveform Reconstruction and Phase Retrieval Using the Photonic Mixer Device". In: *IEEE Photonics Journal* 7.3, June 2015, pp. 1-16. ISSN: 1943-0655. DOI: 10.1109/JPHOT.2015.2427747. URL: https://doi.org/10.1109/JPHOT.2015.2427747.

---

[1] A complete and updated list of publications can be found under the section "Publications" of my personal website: https://www.uni-siegen.de/zess/ese.home/personen/conde.html