Héctor Andrade Loarca

Curriculum Vitae

General Information

Birth Date	March 9th, 1991
Birth Place	Querétaro, Querétaro, Mexico
Residence	Berlin, Germany
Nationality	Mexican

Education

2017-present **PhD in Mathematics**, *Technische Universität Berlin (TUB)*, Berlin, Germany, Main topic: Mathematical Foundations for Learning in Inverse Problems.
Supervised by Professor Gitta Kutyniok

2015-2017 **MSc in Mathematics**, *Technische Universität Berlin (TUB)*, Berlin, Germany, *GPA 1.2/1.0*.
Thesis: "Fast Sparse Light Field Reconstruction with Shearlet-Based Inpainting", Supervised by Professor Gitta Kutyniok

2013-2014 **BSc in Mathematics**, *National Autonomous University of Mexico (UNAM)*, Mexico City, Mexico, *GPA 9.93/10* .
Thesis:"Acoustic Metafluid: Periodic Homogenization by two scale convergence", Degree with honours, Supervised by Professor Antonio Capella

2009-2013 **BSc in Physics**, *National Autonomous University of Mexico (UNAM)*, Mexico City, Mexico, *GPA 9.80/10* .

Professional Experience

February-August 2015 Data Scientist, OPI Analytics (`https://opianalytics.com/`), Mexico City, Mexico

January 2014-August 2015 Research Assistant in Institute of Mathematics, UNAM (with Professor Antonio Capella Kort): Numerical simulation of effective properties in physical materials with microstructure, Mexico City, Mexico

February-June 2015 Teaching Assistant of Computational Methods for Statistical Physics (with Professor David P. Sanders), School of Science, UNAM, Mexico City, Mexico

August-November 2014 Teaching Assistant of Electromagnetism I (with Professor Mirna Villavicencio Torres), School of Science, UNAM, Mexico City, Mexico

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February-June 2014 Teaching Assistant of Electromagnetism I (with Professor Mirna Villavicencio Torres), School of Science, UNAM, Mexico City, Mexico

February-June 2014 Teaching Assistant of Ordinary Differential Equations (with Professor Maria del Carmen Jorge y Jorge), School of Science, UNAM, Mexico City, Mexico

August-December 2013 Teaching Assistant of Classical Mechanics (with Professors David Phillip Sanders and Pablo Barberis Blostein), School of Science, UNAM, Mexico City, Mexico

Summer 2007,2008 Work at CFATA-UNAM (Center of Applied Physics and Advanced Technology) in Shock Wave Lab with Phd Achim Max Loske Mehling (development of electronic circuits to implementations in Shock Wave Machines), Querétaro, Mexico

List of Publications

- H. Andrade-Loarca, G. Kutyniok, O. Öktem, *"Shearlets as Feature Extractor for Semantic Edge Detection: The Model-Based and Data-Driven Realm"*, preprint arXiv:1911.12159, 2019
- H. Andrade-Loarca, A. Hashemi, S. Haufe, K.-R. Müller, G. Kutyniok, *"Deep Brain Source Imaging: A LSTM-inspired Approach for EEG Source Localization based on Sparse Bayesian Learning"*, accepted in Signal Processing with Adaptive Sparse Structured Representations (SPARS) Workshop, 2019
- H. Andrade-Loarca, G. Kutyniok, O. Öktem, P. Petersen, *"Extraction of digital wavefront sets using applied harmonic analysis and deep neural networks"*, SIAM J. Imaging Sciences, Vol. 12, No. 4, pp. 1936-1966, 2019
- H. Andrade-Loarca, *"Fast Sparse Light Field Reconstruction with Shearlet-Based Inpainting"*, Master Thesis, supervised by Prof. Gitta Kutyniok, Technische Universität Berlin, 2017
- H. Andrade-Loarca, *"Acoustic Metafluid: Periodic Homogenization by two scale convergence"*, Bachelor Thesis, supervised by Prof. Antonio Capella Kort, UNAM, 2015

Invited Talks

May 2019 AFG Oberseminar, TU Berlin, Berlin, Germany; with talk "Insights on learning hard inverse problems"

February 2019 AFG Oberseminar, TU Berlin, Berlin, Germany; with talk "Extraction of digital wavefront sets using applied harmonic analysis and deep neural networks"

August 2018 JuliaCon, International Julia Conference Invited Speaker, UCL, London, UK; with talk "LightFields.jl: Fast 3D image reconstruction for VR applications"

July 2018 PyData Berlin, International Python Conference Invited Speaker, Charite, Berlin, Germany; with talk "LightFields.jl: Fast 3D image reconstruction for VR applications"

August 2018 AFG Oberseminar, TU Berlin, Berlin, Germany; with talk "Learned Tomographic Reconstruction and Wavefront Set"

June-July 2017 PyData Berlin, International Python Conference Invited Speaker, HTW Berlin, Berlin, Germany; with talk "Shearlab.jl: Fast Multidimensional Signal Processing"

June 2017 JuliaCon, International Julia Conference Invited Speaker, UC Berkeley, California, USA; with talk "Shearlab.jl: Fast Multidimensional Signal Processing"

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Scientific Talks and Workshops

May 2019	Digital Future Conference, Berlin, Germany: Attending as Young Digital Changer
February 2019	GAMM Annual Meeting, TU Wien, Vienna, Austria; with talk "Extraction of wavefront sets by deep convolutional neural networks and shearlets"
January 2019	Deep Learning and Inverse Problems Workshop, KTH, Stockholm, Sweden; with talk "Learned Primal Dual Reconstruction in Shearlet Domain and Wavefront set recovery"
June 2018	SIAM Conference on Imaging Science, Bologna University, Bologna, Italy; with talk "Solving Inverse Problems in Imaging with Shearlab.jl"
May 2018	Digital Future Science Match, Berlin, Germany: Attending as Young Digital Changer
July-August 2016	BMS Summer School: Mathematical and Numerical Methods in Image Processing, TU Berlin, Berlin, Germany
July 2016	7th European Congress of Mathematics, TU Berlin, Berlin, Germany
December 2015	2nd International Matheon Conference on Compressed Sensing and its Applications, TU Berlin, Berlin, Germany
September 2015	Shape-Up conference, TU Berlin, Berlin, Germany
August-September 2014	BMS Summer School: Applied Analysis for Materials, Berlin Mathematical School, Technische Universität Berlin, Berlin, Germany
July 2014	First Intensive Program in high performance scientific computing, Geophysics Institute, UNAM, Mexico City, Mexico
July 2013	Third Summer School in Mathematics, CINMA, Querétaro, Mexico
July 2012	Second Summer School in Mathematics, CINMA, Querétaro, Mexico
July 2011	First Summer School in Mathematics, CINMA, Querétaro, Mexico
July 2011	Summer School in Mathematics, IMATE, UNAM, Cuernacava, Morelos, Mexico

Academic Activities

February 2018	6th BMS Student Conference, ZIB, Berlin, Germany; part of organization committee
December 2017	2nd BMS Career Talk, Urania, Berlin, Germany; part of organization committee
December 2017	3rd International MATHEON Conference on Compressed Sensing and its Applications, TU Berlin, Berlin, Germany; part of organization committee
December 2017	CoSIP Intense Course on Deep Learning, TU Berlin, Berlin, Germany; part of organization committee

Extracurricular Activities

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December 2016-December 2017	BMS Student Representative
November 2007	National Physics Olympiad, Tuxtla Gutíerrez, Chiapas, Mexico
October 2007	National Logic Olympiad, Morelia, Michoacan, Mexico
November 2006	National Mathematical Olympiad, Zacatecas, Zacatecas, Mexico

Awards and Scholarships

2018	Diversity Scholarship in JuliaCon 2018, International Julia Conference, UCL, London, UK
2018	Young Digital Changers Scholarship, Digital Future Science Match, Berlin, Germany
2017-2020	Berlin Mathematical School Phase II Scholarship, Berlin, Germany
2017	Diversity Scholarship in JuliaCon 2017, International Julia Conference, UC Berkeley, California, USA
2015-2017	Complementary Scholarship for Outstanding Mexican Graduate Students given by the Mexican Secretary of Education
2015-2017	Berlin Mathematical School Phase I Scholarship, Berlin, Germany
2014	Candidate to "Gabino Barreda" medal for best class student of Mathematics by UNAM
2014	Candidate to "Gabino Barreda" medal for best class student of Physics by UNAM.

Academic Memberships

- Berlin Mathematical School (BMS).
- Berlin Mathematical Research Center (MATH+).
- Activity Group for Mathematics of Data Science (MATH+MoDS).
- Julia Users Group Berlin.

Languages

Spanish	Mother tongue	
English	Fluent	*C1*
German	Fluent	*C1*
French	Basic	*A2*
Japanese	Basic	*A1*

Computer Skills

Python, Julia, PostgreSQL, R	High Level

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Fortran 90, C/C++	High Level
Wolfram Mathematica	Medium Level
Hadoop, Spark	Medium Level
OpenMPI, CUDA, OpenCL	Medium Level
JavaScript, HTML5, CSS	Low Level

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