

Xavier F. C. Sánchez Díaz

PHD CANDIDATE · COMPUTER SCIENTIST

Trondheim, Norway

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Education

Norges Teknisk-Naturvitenskapelige Universitet

Trondheim, Norway

PHD IN ARTIFICIAL INTELLIGENCE

2021–Present

Tecnológico de Monterrey

Monterrey, Mexico

MSC. IN INTELLIGENT SYSTEMS – 94/100, *cum laude*

Jan 2016–Dec 2017

Universidad Autónoma de Nuevo León

Monterrey, Mexico

B.S. IN SOFTWARE ENGINEERING – 94.5/100, *summa cum laude*

Jan 2010–May 2015

- Ing. Arturo Cárdenas Berrueto Academic Merit Medal

Experience

ENGINEERING AND COMPUTER SCIENCE

Department of Mathematics, Tecnológico de Monterrey

Monterrey, Mexico

LEAD DEVELOPER

May 2013–Dec 2015

- Developed and implemented online evaluations for various mathematics MOOCs at Coursera.
- Implemented a multiplayer, web-based board game, among many other projects focusing on mathematics education.
- Took part in the writing and translation of various academic papers presented at international conferences.

Center for Intelligent Systems, Tecnológico de Monterrey

Monterrey, Mexico

KNOWLEDGE ENGINEER

May 2017–Jul 2017

- Developed and implemented a knowledge representation framework for a conversational chatbot as an intelligent tutor for “Introduction to Mathematics” (MA-1001), using IBM Watson and dealing with knowledge abstraction and reasoning.

Research Group with Strategic Focus on Intelligent Systems

Monterrey, Mexico

DATA SCIENTIST

Dec 2018–May 2020

- Developed and implemented multiple machine learning models for market segmentation, resource allocation, and sales prediction for a university-industry collaboration scheme. Most of the work is under NDA.

TEACHING

Computer Science Department, Tecnológico de Monterrey

Monterrey, Mexico

LECTURER

Aug 2018–PRESENT

- TC2020, TC2037 – Mathematical Foundations of Computing (Autumn ‘18, Autumn ‘20, Spring ‘21)
- TC1017 – Problem Solving with Programming (Spring ‘19, Autumn ‘19)
- TC2006, TC2037 – Programming Languages (Autumn ‘18–Autumn ‘19, Spring ‘21)
- TC1003/B – Discrete Mathematics & Introduction to Linear Algebra (Spring ‘20, Spring ‘21)
- CV1012 – Numerical Methods for Civil Engineering (Spring ‘20)
- TC1031 – Data Structures and Fundamental Algorithms (Autumn ‘20)

Research

UNDERGRADUATE

Universidad Autónoma de Nuevo León

Monterrey, Mexico

ORIENTAUANL

Aug 2014–May 2015

- Worked under supervision of Dr. Sergio Alcaraz-Corona on the foundations of a recommender system for vocational orientation.

Tecnológico de Monterrey

DEPARTMENT OF MATHEMATICS: RESEARCH ASSISTANT

Monterrey, Mexico

Jan 2014–Dec 2015

- Worked under supervision of Dr. Patricia Salinas Martínez on mathematics learning, visualisation and assessment using digital technologies.

GRADUATE

Tecnológico de Monterrey

Monterrey, Mexico

RESEARCH GROUP WITH STRATEGIC FOCUS ON INTELLIGENT SYSTEMS

Jan 2016–Dec 2017

- Worked under supervision of Dr. Hugo Terashima-Marín on hyper-heuristics, algorithm selection and evolutionary computation for combinatorial optimisation.
- **Thesis:** ANALYSIS OF A FEATURE-INDEPENDENT HYPER-HEURISTIC MODEL FOR CONSTRAINT SATISFACTION AND BINARY KNAPSACK PROBLEMS.
 - Proposed a hyper-heuristic model to tackle on combinatorial optimisation problems even when no problem information is available. The method can find suitable solvers from the combination of non-promising heuristics, and can be extended for other optimisation problems.

Selected Publications

For a comprehensive list, please refer to my  Google Scholar.

Tecnológico de Monterrey

Monterrey, Mexico

DEPARTMENT OF MATHEMATICS

Aug 2013–Dec 2015

- P. Salinas, E. Quintero and X. Sánchez-Díaz. “Math and Motion: a Coursera MOOC to rethink math assessment”, in Learning and Collaboration Technologies. *Lecture Notes in Computer Science* (9192), 313–324. Springer. Presented at the 17th International Conference on Human-Computer Interaction, Los Angeles, CA, United States.

Tecnológico de Monterrey

Monterrey, Mexico

RESEARCH GROUP WITH STRATEGIC FOCUS ON INTELLIGENT SYSTEMS

Jan 2016–PRESENT

- X. Sánchez-Díaz, J. C. Ortiz-Bayliss, I. Amaya, J. M. Cruz-Duarte, S. E. Conant-Pablos and H. Terashima-Marín. “A Feature-independent Hyper-heuristic Approach for Solving the Knapsack Problem”, *Applied Sciences*. 2021, 11, 10209. doi: 10.3390/app112110209.
- X. Sánchez-Díaz, J. C. Ortiz-Bayliss, I. Amaya, J. M. Cruz-Duarte, S. E. Conant-Pablos and H. Terashima-Marín. “A Preliminary Study on Feature-independent Hyper-heuristics for the 0/1 Knapsack Problem”, 2020 IEEE Congress on Evolutionary Computation (CEC), Glasgow, United Kingdom, 2020, pp. 1–8, doi: 10.1109/CEC48606.2020.9185671.
- E. Lara-Cárdenas, X. Sánchez-Díaz, I. Amaya and J.C. Ortiz-Bayliss. “Improving Hyper-Heuristic Performance for Job Shop Scheduling Problems Using Neural Networks”, *Advances in Soft Computing. MICAI 2019. Lecture Notes in Computer Science*, vol 11835. Springer, Cham. doi: 10.1007/978-3-030-33749-0_13
- X. Sánchez-Díaz, G. Ayala-Bastidas, P. Fonseca-Ortiz and L. Garrido. “A Knowledge-based Methodology for Building a Conversational Chatbot as an Intelligent Tutor”, *Advances in Computational Intelligence. MICAI 2018. Lecture Notes in Computer Science*, vol 11289. Springer, Cham. doi: 10.1007/978-3-030-04497-8_14

Skills & Coursework

- Soft Computing and Artificial Intelligence
- Data Science and Machine Learning
- Computability and Algorithm Design
- Software Engineering
- Avid user of **L^AT_EX**, Scientific Python and Git
- Familiar with Julia, MATLAB, and the Databricks environment Microsoft and GNU/Linux-based systems
- Moderate knowledge of C++, Mathematica and WebDev
- IELTS Academic CEFR C1

Online Courses

University of Michigan

Coursera

PYTHON FOR EVERYBODY

Aug 2021

Five-course specialisation: Python basics, Data structures, Databases, Web-scraping and Data Processing and Visualisation. Verify certificate here 

University of Michigan

Coursera

STATISTICS WITH PYTHON

Jan 2021

Three-course specialisation: Data Visualisation, Statistical Inference and Fitting Statistical Models. Verify certificate here 

Imperial College London

Coursera

MATHEMATICS FOR MACHINE LEARNING

Aug 2021

Three-course specialisation: Linear Algebra, Multivariate Calculus and PCA. Verify certificate here 