Nicolas Espinosa Dice

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Education

Harvey Mudd College **Claremont, California**
B.S., Mathematics and Computer Science, Major GPA: 3.84 *Expected May 2022*

Courses: Geometry of Big Data, Artificial Intelligence, Neural Networks, Mathematics of Big Data, Algorithms, Algebraic Geometry, NLP with Deep Learning, Bayesian Statistics (Sp '22)

Research Experience

Department of Mathematics, Harvey Mudd College **Claremont, California**
Student Researcher, Geometric Deep Learning *September 2021–Present*
Advisor: Weiqing Gu

- Built a temporal graph convolutional network (T-GCN) model to detect seizures in electroencephalogram (EEG) data.
- Working to integrate EEG and gait data with geometric deep learning methods to diagnose Parkinson's disease and analyze its progression.

AMISTAD Lab **Claremont, California**
Student Researcher, Statistical Learning *November 2020–Present*
Advisor: George Montanez

- Derived theoretical generalization error bounds of learning algorithms in terms of algorithm capacity by introducing a novel geometric representation of algorithm bias.
- Paper under review at *33rd International Conference on Algorithmic Learning Theory* (*ALT 2022*).

AMISTAD Lab **Claremont, California**
Student Researcher, Graphical Models *May 2020–September 2020*
Advisor: George Montanez

- Developed a probabilistic model of abductive reasoning using a Bayesian network framework that unifies selective and creative abduction and constructs common-cause explanations of observations.
- First author of paper published at *13th International Conference on Agents and Artificial Intelligence* (*ICAART 2021*).

Industry Experience

Clinic Program, Harvey Mudd College **Claremont, California**
Project Manager *September 2021–Present*

- Building an unsupervised anomaly detection model on time-series marketing data through a dynamic regression model and a long short-term memory (LSTM) autoencoder.

Etsy **Brooklyn, New York**
Software Engineer Intern *May 2021–August 2021*

- Developed a transformer-based deep learning model with DistilBERT architecture using Tensorflow to identify safe search queries with over 91% accuracy.
- Improved query understanding at Etsy by retraining an existing transformer-based model that classifies search queries as broad or direct, increasing accuracy by 9% and reducing model volatility.

Viasat **Carlsbad, California**
Software Engineer Intern *May 2019–August 2019*

- Built REST API using CherryPy Python Library and a global runtime manager in C# to enable communication between Microsoft HoloLens and Link 16 radio network and handle distribution of data into assets, allowing for live updating of heads-up display.
- Presented by Viasat at *The Association of the United States Army Conference* (*AUSA 2019*).

Publications

[1] [Under Review] Ramya Ramalingam, **Nicolas Espinosa Dice**, Megan Kaye, and George Montanez. Bounding generalization error through bias and capacity. In *Algorithmic Learning Theory*, 2022.

[2] **Nicolas Espinosa Dice**, Megan L Kaye, Hana Ahmed, and George D Montanez. A probabilistic theory of abductive reasoning. In *ICAART (2)*, pages 562–571, 2021.

Teaching and Leadership Experience

Honor Board **Claremont, California**
Chair (2020-2021) *October 2018–Present*
- Oversaw 22 students on Harvey Mudd College's Honor Board, chaired hearings regarding Honor Code violations, and mediated settlements between students and faculty.

Society of Professional Latinx in STEM **Claremont, California**
Public Outreach Director (2019-2020) *September 2018–Present*
- Led biweekly STEM tutoring sessions for high school students through HMC's Society of Professional Latinx in STEM and in partnership with Uncommon Good.

Artificial Intelligence Course Assistant **Claremont, California**
Grader and Tutor *January 2021–May 2021*

Scholarships

Harvey S. Mudd Merit Award **Claremont, California**
Harvey Mudd College *September 2018–Present*
- $10,000/year scholarship for "superior academic achievement and ability to contribute to the College."

Skills

Languages: English (Native Speaker), Spanish (Fluent)

Programming Languages: Python, C++, Java, SQL, R, Scala, C#

Programming Libraries: TensorFlow, PyTorch, Keras, Scikit-learn