

# NICO A. ESPINOSA DICE

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## EDUCATION

Harvey Mudd College, Claremont, CA (GPA: 3.83)

Expected May 2022

B.S., Mathematics and Computer Science; Humanities Concentration in Philosophy

## RELEVANT COURSEWORK

**Fall 2021:** Geometry of Big Data, Natural Language Processing, Statistical Theory

**Completed:** Neural Networks, Artificial Intelligence, Algorithms, Mathematics of Big Data, Data Structures, Algebraic Geometry

## SKILLS

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

**Models:** Neural Networks (Transformers, RNNs, CNNs), Bayesian Networks, SVMs, Random Forest, Naive Bayes

**Software:** TensorFlow, PyTorch, Keras, Fastai, Scikit-learn, Pandas, NumPy, Matplotlib, Spark

## RESEARCH EXPERIENCE

**AMISTAD Lab**, Harvey Mudd College – *Machine Learning Researcher, Team Lead*

May 2020 - Present

- Derived theoretical generalization error bounds of learning algorithms in terms of algorithm capacity by introducing a novel geometric representation of algorithm bias.
- Developed a probabilistic model of abductive logical reasoning using a Bayesian network framework that constructs novel explanations of observed effects.

## TECHNICAL EXPERIENCE

**Etsy, Inc.** – *Software Engineer Intern*

May 2021 - August 2021

- Developed a transformer 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 model that classifies search queries as broad or direct, increasing accuracy by 9% and reducing model volatility.

**Viasat, Inc.** – *Software Engineer Intern*

May 2019 - August 2019

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

**General Assembly: Data Science Course** – *Student*

June 2017 - August 2017

- Built a random forest regression model using Scikit-Learn and Python to predict the final sale prices of Iowa houses with 90% accuracy and completed General Assembly's Data Science course.

## LEADERSHIP EXPERIENCE

**Honor Board**, Harvey Mudd College – *Judiciary Board Chair (2020-2021)*

October 2018 - Present

- Oversee 22 students on Harvey Mudd College's Honor Board, responsible for upholding the Honor Code.
- Chair hearings regarding Honor Code violations and mediate settlements between students and faculty.

## PUBLICATIONS

- **Espinosa Dice N**, Kaye M, Ahmed H, Montañez G, "A Probabilistic Theory of Abductive Reasoning." *13th International Conference on Agents and Artificial Intelligence (ICAART 2021)*, 2021.
- [Under Review] Ramalingam R, **Espinosa Dice N**, Kaye M, Montañez G, "Generalization Bounds of Learning Algorithms Through Algorithm Capacity and Geometric Representations of Bias." *33rd International Conference on Algorithmic Learning Theory (ALT 2022)*, 2022.

## AWARDS

**Harvey S. Mudd Merit Award**, Harvey Mudd College, 2018 - Present

*Awarded \$10,000 yearly scholarship for "superior academic achievement and ability to contribute to the College."*