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Nelson Abdiel Colón Vargas

(Nel Abdiel)

EDUCATION

The Data Incubator, Washington, D.C.
Certificate in Data Science
Selected among the less than 4% of +1900 applicants.

University of Iowa, Iowa City, Iowa.
Ph.D., Mathematics
Thesis Title: Localized Skein Algebras As Frobenius Extensions.
Advisor: Dr. Charles Frohman
M.Sc., Mathematics

University of Northern Iowa, Cedar Falls, Iowa.
M.A., Mathematics
Research Paper: Discrete Subgroups of $SL_2(R)$.
Advisor: Dr. Min Ho Lee

University of Puerto Rico, Rio Piedras Campus, San Juan, Puerto Rico.
B.Sc., Mathematics

PUBLICATIONS

- Nel Abdiel and C. Frohman *The Localized Skein Algebra is Frobenius*. Published.

- Nel Abdiel and C. Frohman *Frobenius Algebras Derived From The Kauffman Bracket Skein Algebras*. Published.

SKILLS

- **Proficient with**: Python, PostgreSQL, Spark, Hadoop, D3.js, Jupyter, Zeppelin, Ambari, Git.
- **Experience with**: Machine Learning, Natural Language Processing, Web Scraping, Data Visualization, Object Oriented Programming.
- **Tools**: Pandas, NumPy/SciPy, Scikit-Learn, NLTK, MrJob, Bokeh, D3, Flask/Django, Heroku, Shiny, Github, Carto, Vagrant, HTML5/CSS3, LaTeX.
- **Familiar with**: R, Spark, Scala, Hadoop, MapReduce, Go, C++, JavaScript, Bootstrap3, MongoDB, Google Analytics, Node.js, CockroachDB, HAWQ, SQLite3, Cassandra.
- **APIs**: Google, Twitter, Spotify, ISBNdb, BandsInTown, Stubhub, Eventbrite, Quandl, Github.
- **Dominance of**: English and Spanish.

EXPERIENCE

Soteria - Security Consulting & Data Analytics, Charleston, S.C.

Data Scientist / Python Developer, June 2016–Present

- Created Python software for extraction and classification of features from unstructured data from +30000 websites a day. Both structured and unstructured data is then automatically saved into a Cassandra database.
- Devised Python pipeline to automate the scoring of +30000 websites received per day.
- Developed predictive model using PCA and a Random Forest Classifier to automate the detection of cyber threats with a 96% accuracy.
- Assembled predictive model for detection of malicious websites based on content by performing Natural Language Processing with the use of TF-IDF Vectorizer and Logistic Regression with a 95% accuracy.
- Built multiple web applications for internal use using Python, Flask, Django, HTML5/CSS3, Bootstrap and D3.js, that allow analysts to interact with data from OSSEC and other services in a more visual matter.
- Contributed to the improvement of already existing solution by boosting predictive model performance and adding new features to web application.
- Was involved in the decision making of the technologies to be implemented for ETL.
- Developed probabilistic model to predict the outcome of ping pong matches in the office.

The Data Incubator, Washington, D.C.

Data Scientist Fellow, Winter 2016
Capstone Project: http://iokilos.herokuapp.com

- Analyzed the distribution of world records in Olympic Weightlifting using the Naive Bayes Classifier from Scikit-Learn.
- Developed an app for strength athletes' training cycles using Clustering Algorithms. The data was scraped from over a thousand pages from various websites.

Other Projects:

- Conducted open-ended analysis of user behaviors on 9+GB of StackOverFlow XML data using Scala, and Spark.
- Analyzed 10+GB of XML data from Simple English and Thai Wikipedia with MapReduce.
- Web scraping and social graph analysis of more than 100,000 photo captions from NYC Social website using Python (Networkx, BeautifulSoup, and Pandas).
- Developed pipelines with Python (Scikit-Learn) for predicting star reviews for businesses based on Yelp's academic dataset.
- Performed Natural Language Processing analysis on Yelp's academic dataset, 325+MB of json data, with Python (NLTK and Scikit-Learn).
- Developed Time Series model for weather data to predict temperature.
- Analyzed New York food inspection reports for the last 4 years, approximately 530,000 records, using advanced SQL and Python (Pandas).

Topology Research, University of Iowa

Graduate Research Student, August 2012-May 2016
Professor Charles Frohman

- Developed a method for reducing the exponential time of Skein computations in Quantum Topology to linear time.
- Provided the first equation to produce actual examples of the existence of torsion in the Kauffman bracket skein algebra.

University of Iowa

Independent Instructor (responsible for all course duties)

- 22M:009 Elementary Functions, Fall 2015
- 22M:008 College Algebra, Summer 2015 & Spring 2014
- 22M:125 Qualifying Exam in Topology Preparation Seminar, Summer 2014
  (Graduate course)

Teaching Assistant (led discussions, graded homework & quizzes, held office hours)

- 22M:133 Manifolds, Spring 2014
  (Graduate course)
- 22M:132 Point Set Topology, Fall 2013
  (Graduate course)
- 22M:016 Calculus For The Biological Science, Spring 2015, Spring 2012 & Fall 2011

Florida State University

Teaching Assistant (led discussions, graded homework & quizzes, held office hours)

- MGF1107 Math for Liberal Arts, Spring 2011
- MGF1106 Math for Liberal Arts, Fall 2010

University of Northern Iowa

Research Assistant, Summer 2010

- Supervised a group of undergraduate researchers working towards generalizing the Black-Scholes model.

University of Northern Iowa

Researcher in Number Theory, Spring 2010

- Studied the relation between discrete subgroups of $SL_2(\mathbb{R})$ and arithmetic functions in number theory.

University of Puerto Rico, Rio Piedras Campus

Teaching Assistant (led discussions, graded homework & quizzes, held office hours)

- Mate3028 Precalculus I-II Summer 2008, 2009
- Mate3024 Precalculus II, Summer 2004
- Mate3023 Precalculus I Summer 2003, Summer 2005

University of Puerto Rico, Center for Biostatistics And Bioinformatics

Researcher in Biostatistics and Bioinformatics, Fall 2008 - Spring 2009

- Responsible for analyzing data and creating statistical models with R.

University of Puerto Rico, Biochemistry and Biophysics Lab

Researcher in Biochemistry and Data Analyst, Fall 2007 - Spring 2009.

- Responsible for collecting data by ways of experimentation and the mathematical analysis of such data.

Tutoring Experience

- Mathematics Tutorial Lab at University of Iowa, Fall 2011 - Spring 2012, Fall 2014
- Mathematics Tutorial Lab at University of Northern Iowa, Fall 2009 - Spring 2010
- Mathematics Tutorial Lab at the University of Puerto Rico, Rio Piedras Campus, Fall 2003 - Spring 2005, Fall 2007 - Spring 2009

Grading Experience

- Grader for Linear Algebra at University of Iowa, Fall 2015.
- Grader for Ordinary Differential Equations at University of Northern Iowa, Spring 2010.
- Grader for Math and Decision Making, Fall 2009.
- Grader for Calculus I, Fall 2009.

INDEPENDENT PROJECTS

Olympic Weightlifting, A Sport Of Numbers.

Click to read on Medium.

- Optimized the Sinclair formula used in Olympic Weightlifting, using Python and Pandas.

Most Consistent Hitters In The Last 30 Years.

Click to see on Kaggle.

- Exploring consistency among Ball players with great batting averages.

The Cost of A Home Run From a 50 Home Run Club Member.

Click to see on Kaggle.

- Analyzed baseball data to uncover the top ten 50 Home Run better paid-per-home-run players.

Starting Pitchers Get Pulled After 2 BB.

Click to see on Kaggle.
Click to read on Medium.

- Analyzed pitching data from 1871-2015 to determined when is the right time to pull a pitcher.

Raspberry Pi/Python Twitterbot

https://twitter.com/nelabdielbot
Click to see one of the scripts on Github.

- Programmed a Raspberry Pi to tweet on its own using Python and the Twitter API.

ConcertiPy!

http://concertipy.herokuapp.com

- Created a web application that uses both the Spotify and BandsInTown API to find events nearby of those artists you follow.

PRESENTATIONS

Talks

- "The Localized Skein Algebra is Frobenius", USTARS, Florida Gulf Coast University, April 2015.
- "The Localized Skein Algebra is Frobenius", Oklahoma State University, Topology Seminar, March 2015.
- "The Localized Skein Algebra is Frobenius", University of Iowa, Topology Seminar, March 2015.
- "Chain Complex and Intersection Homology", University of Iowa, Topology Reading Seminar, January 2015.
- "A Brief Introduction To Geometric Group Theory", University of Iowa, Graduate And Undergraduate Student Seminar, November 2014.
- "2-TQFT and Frobenius Algebras", University of Iowa, Graduate And Undergraduate Student Seminar, September 2014.
- "Examples Of Finitely Generated Skein Algebras", University of Iowa, Topology Seminar, Spring 2014.
- "Groups Acting on Hyperbolic Spaces", University of Iowa, Topology Reading Seminar, Fall 2013.
- "Existence And Uniqueness of Prime Decompositions Of 3-Manifolds", University of Iowa, Topology Reading Seminar, Spring 2013.
- "The Geometry And Topology Of 3-Manifolds", University of Iowa, Topology Reading Seminar, Fall 2012.
- "A Brief Introduction to TQFT, University of Iowa", Underground Topology Seminar, Fall 2012.
- "The L-Function Of An Automorphic Form", University of Iowa, Representation Theory Seminar, Spring 2012.
- "Eisenstein Series And The Sum of Divisors Function", University of Iowa, L-Function Seminar, Fall 2011.

- "A Brief Introduction To Modular Forms", University of Puerto Rico, Rio Piedras Campus, Undergraduate Seminar, Spring 2011.
- "Modular Forms/Functions And Their Relation With Arithmetic Functions In Number Theory", Florida State University, Algebra Seminar, Fall 2010.

Guest Lecturer

- "Rank Vs Genus of 3-Manifolds", University of Iowa, Math Department, Fall 2013.
- "Representations of Knot Groups", University of Iowa, Math Department, Fall 2013.
- "Fundamental Groups of (p,q)-Torus Knots", University of Iowa, Math Department, Fall 2012."

Posters

- "Computations in the Relative Skein of a Local Annulus," USTARS (Underrepresented Students in Topology and Algebra Research Symposium), University of California, Berkeley, CA, April 2014.

CONFERENCES/WORKSHOPS ATTENDED

- USTARS, Florida Gulf Coast University, 18-19 April 2015.
- GSTGC, University of Illinois, Urbana-Champaign, 28-29 March 2015.
- 52nd Texas Geometry And Topology Conference, UT Austin, November 14-16 2014.
- The 10th William Rowan Hamilton Geometry And Topology Workshop, The Hamilton Institute at The University of Dublin, August 26-30 2014.
- Workshop on Contact Geometry in Dimension Three And Higher, University College London, July 28 - August 1 2014.
- Cube Complexes and Groups, Centre For Symmetry And Deformation, July 7-11 2014.
- The 31st Annual Workshop in Geometric Topology, UWM, June 12-14 2014.
- Gear Junior Retreat, University of Michigan, May 23-June 1 2014.
- Georgia Topology Conference, UGA, May 21-25 2014.
- RTG Workshop on Geometric Structures And Discrete Groups, UT Austin, May 2-4 2014.
- USTARS, UC Berkeley, April 11-13 2014.
- GSTGC, University of Texas, Austin April 2-4 2014.
- Physics and Mathematics of Link Homology, CRM, June 24-July 5 2013.
- Cube Complexes and 3-manifolds, University of Illinois at Chicago, May 20-30 2013.

- The Topology of 3-dimensional Manifolds, CRM, May 6-17 2013.
- USTARS, Purdue, April 19-21 2013.
- GSTGC, Notre Dame, April 6-7 2013.

SERVICE

The Data Incubator

- Social Chair, Winter 2016

University of Iowa

- University of Iowa Math Department Graduate Program Recruiter
  - SIDIM Conference, University of Puerto Rico, Mayagüez Campus, February 2015
- Faculty Mentoring Workshop Panelist, November 2014
- Iowa Math Modeling Competition Judge, Fall 2014
- Graduate Student Senate
  - International Committee Member, Spring 2012 - Spring 2014
- COGS Steward, Fall 2012 - Spring 2013
- TAPE Orientation for International Students Panelist, February 2012

United Ways of East Central Iowa

- Volunteer Translator, July 2014

SELECTED AWARDS AND HONORS

- Data Science Fellowship at the Data Incubator D.C.
- Ballard Seashore Fellowship at the University of Iowa.
- GAANN Fellowship at the University of Iowa.
- Latin American-Caribbean Scholarship at Florida State University.
- AGEP Scholarship at the University of Northern Iowa.

PROFILES

- https://github.com/nelabdiel
- https://medium.com/@nelabdiel
- https://medium.com/data-science-nel
- https://www.kaggle.com/nelabdiel
- https://twitter.com/nelabdiel

PROFESSIONAL MEMBERSHIPS

- Geometric Structures And Representation Varieties (GEAR), 2014-Present.
- American Mathematical Society (AMS), 2009-Present.

REFERENCES

Available upon request.

Last updated: December 18, 2016