Nick Kunz

Senior Data Scientist

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Education

Cornell University — Ithaca, NY   2026
Ph.D., Systems Engineering
Advisor: H. Oliver Gao

Columbia University — New York, NY   2019
M.S., Urban Planning, Urban Analytics
Advisors: Lance Freeman, Kazuki Sakamoto

Harvard University — Cambridge, MA   2012
Urban Planning
Advisor: Nick Hornig

Arizona State University — Tempe, AZ   2012
B.S. (Hons.), *summa cum laude*, Housing & Urban Development
Advisors: Kevin Kellogg, Michael Underhill, Trevor Barger

Research

Publications

N. Kunz, H. O., Gao, "Global Geolocated Realtime Data of Interfleet Urban Transit Bus Idling" *In Preparation.* 2023.

W. Wu, **N. Kunz**, P. Branco, "ImbalancedLearningRegression" in *Machine Learning and Knowledge Discovery in Databases: European Conference, ECML PKDD, September 19–23, 2022, Grenoble, France,* Proceedings, Part VI, Lecture Notes in Computer Science, vol 13718. Springer, pp. 645–648, March 2023. [Link]

Industry

N. Kunz, "n-Dimensional Mapping by Normalized Value Approximation: Squad Immersive Virtual Trainer (SiVT) Safety Performance Metrics," Integrated Visual Augmentation System (IVAS), Microsoft, Redmond, WA, 2021. Protected from public disclosure pursuant to: Trade Secrets Act 18 USC § 1905, 5 USC § 552(b)(4), and C3.2.1.4. of US Dept. of Defense Regulation 5400.7-R. DISTRIBUTION F.

N. Kunz, "Normalized n-Dimensional Inverse Euclidean Distance: Combining Independent Performance Metrics," Integrated Visual Augmentation System (IVAS), Microsoft, Redmond, WA, 2021. Protected from public disclosure pursuant to: Trade Secrets Act 18 USC § 1905, 5 USC § 552(b)(4), and C3.2.1.4. of US Dept. of Defense Regulation 5400.7-R. DISTRIBUTION F.

N. Kunz, "An Exploratory Data Analysis of the Gavin Cup: Brining Readiness & Performance Metrics Into Focus," Integrated Visual Augmentation System (IVAS), Microsoft, Redmond, WA, 2020. Protected from public disclosure pursuant to: Trade Secrets Act 18 USC § 1905, 5 USC § 552(b)(4), and C3.2.1.4. of US Dept. of Defense Regulation 5400.7-R. DISTRIBUTION F.

Theses

N. Kunz, "Unsupervised Learning for Submarket Modeling: A Proxy for Neighborhood Change," M.S. Thesis, Grad. Sch. of Arch., Plan., and Pres. (GSAPP), Columbia Univ., New York, NY, 2019. [Online]. Availabile: Columbia Academic Commons. [Link]

N. Kunz, "Realizing Interactive Architecture: A Driver of the Knowledge Economy," B.S. (Hons.) Thesis, Barrett, The Hons. Col., Arizona State Univ., Tempe, AZ, 2012. [Online]. Availabile: Barrett, The Honors College Thesis/Creative Project Collection. [Link]

Industry Experience

Deloitte — Seattle, WA   2021 - Present
Senior Data Scientist

Microsoft — Redmond, WA   2020 - 2021
Data Scientist

Pacific Prospecting Group — Seattle, WA   2017 - 2019
Data Scientist

Brawner & Company — Snoqualmie, WA   2016 - 2017
Development Analyst

bcWORKSHOP — Dallas, TX   2013 - 2014
Fellow

Software Packages

SMOGN: Synthetic Minority Over-Sampling Technique for Regression with Gaussian Noise   2020
 Github [Link] PyPI [Link] Kaggle [Link] Stack Exchange [Link]

A novel pre-processing algorithm designed to address imbalanced data for regression problems. Conducts over-sampling with traditional interpolation, as well as with the introduction of Gaussian noise. Selects between the two over-sampling techniques by the KNN distances underlying a given observation.

NestedHyperBoost: Nested Cross-Validation for Bayesian Optimized Gradient Boosting   2020
 Github [Link] PyPI [Link]

Unifies Nested K-Fold Cross-Validation, Bayesian Hyperparameter Optimization, and Gradient Boosting. Designed for rapid prototyping on small to mid-sized data sets. Quickly obtains high quality prediction results by abstracting away tedious hyperparameter tuning and implementation details in favor of usability and implementation speed.

NestedHyperLine: Nested Cross-Validation for Bayesian Optimized Linear Regularization   2020
 Github [Link] PyPI [Link]

Unifies Nested K-Fold Cross-Validation, Bayesian Hyperparameter Optimization, and Linear Regularization. Designed for rapid prototyping on small to mid-sized data sets. Quickly obtains high quality prediction results by abstracting away tedious hyperparameter tuning and implementation details in favor of usability and implementation speed.

CRASSMAT: Conditional Random Sampling Sparse Matrices   2019
 Github [Link] CRAN [Link]

A novel matrix sampling algorithm designed to conditionally random sample sparse matrices. Useful for training and test set splitting prior to model fitting in cross-validation procedures and for estimating the predictive accuracy of imputation methods, such as Matrix Factorization, Non-Negative Matrix Factorization (NNMF), and Singular Value Decomposition (SVD).

Selected Projects

N. Kunz, S. Huang, S. Osakata, "Cloudy Night: Activating Park Space by Illuminated Interactivity," Grad. Sch. of Arch., Plan., and Pres. (GSAPP), Columbia Univ., New York, NY, 2019. [Online]. Availabile:

⌨ GSAPP [Link] Github [Link] ▶ YouTube [Link] ✺ Faculty [Link]

N. Kunz and S. Bhele, "Signal or Noise? Qualified Opportunity Zone Affect on Development Activity in Queens," Grad. Sch. of Arch., Plan., and Pres. (GSAPP), Columbia Univ., New York, NY, 2019. [Online]. Availabile:

⌨ GSAPP [Link] Github [Link] ▤ Issuu [Link] ✺ Faculty [Link]

E. Hudgins and **N. Kunz**, "Planning for Extreme Settlements, McMurdo Station, Antarctica," Grad. Sch. of Arch., Plan., and Pres. (GSAPP), Columbia Univ., New York, NY, 2018. [Online]. Availabile:

⌨ GSAPP [Link] ▤ Issuu [Link]

J. Karasik, S. Lee, **N. Kunz**, et. al. "Negotiating Fragments (Restructuring Quarto Workshop), Genoa, Italy," Grad. Sch. of Arch., Plan., and Pres. (GSAPP), Columbia Univ., New York, NY, 2018. [Online]. Available:

⌨ GSAPP [Link] ▶ YouTube [Link] ▤ Issuu [Link] ▤ Issuu [Link] ▦ Press [Link]

N. Kunz, "Proportionalities: A Decade of Housing Markets to Subway Stations in Manhattan from 2006 to 2016," Grad. Sch. of Arch., Plan., and Pres. (GSAPP), Columbia Univ., New York, NY, 2017. [Online]. Available:

⌨ GSAPP [Link] ⌨ GSAPP [Link] ▤ Issuu [Link] ✺ Faculty [Link]

G. S. Coch, S. Nelsen, **N. Kunz**, K. Warner, "Seeking Refuge: The Geography of Migrant Deaths Along the US-MX Border," Grad. Sch. of Arch., Plan., and Pres. (GSAPP), Columbia Univ., New York, NY, 2017. [Online]. Availabile:

⌨ GSAPP [Link] Ⓜ Medium [Link]

N. Kunz, "Traditional Theory and the Historic Preservation of Singapore in the Period of the 1980's," Grad. Sch. of Arch., Plan., and Pres. (GSAPP), Columbia Univ., New York, NY, 2017. [Online]. Availabile:

▤ Issuu [Link]

N. Kunz, "Health & Wellness Alliance for Children: Children's Asthma, Healthy Physical Environments, Dallas County, Texas," bcWORKSHOP, Dallas, TX, 2014. [Online]. Availabile:

▤ Issuu [Link]

N. Kunz, "The Bexar Street Corridor: A Century in Development, Dallas, Texas," bcWORKSHOP, Dallas, TX, 2013. [Online]. Availabile:

▤ Issuu [Link] ▤ Issuu [Link] ⌂ bc [Link] ▼ Vimeo [Link]

N. Kunz, "Fenway-Kenmore Square: Comprehensive Planning & Finance, Cambridge, Massachusetts," Grad. Sch. of Design (GSD), Harvard Univ., Cambridge, MA, 2012. [Online]. Availabile:

▤ Issuu [Link]

N. Kunz, "Danelle Plaza: Complete Street Mobility Planning, Tempe, Arizona," Herberger Inst. for Des. and the Art., Arizona State Univ., Tempe, AZ, 2012. [Online]. Availabile:

▤ Issuu [Link]

N. Kunz, "Ascension: Multifamily Mixed-Use Real Estate Development Proposal, Tempe, Arizona," n Creative Studios, Phoenix, AZ, 2012. [Online]. Availabile:

▤ Issuu [Link]

N. Kunz, "Sui Residence: Second Story Architecture Development Proposal, Paradise Valley, Arizona," n Creative Studios, Phoenix, AZ, 2011. [Online]. Availabile:

▤ Issuu [Link]

Honors & Awards

Systems Engineering Fellowship, Cornell University — Ithaca, NY	2022 - 2023
AVID Applause Award, Deloitte Consulting — Seattle, WA	2022
Distinguished Alumni Award, Arizona State University — Tempe, AZ	2016
Eli Segal AmeriCorps Education Award, AmeriCorps — Dallas, TX	2014
Dingwall Foundation Scholarship, William Orr Dingwall Foundation — Washington, DC	2011 - 2012
Barrett, The Honors College Scholarship, Arizona State University — Tempe, AZ	2010 - 2012
AIERF Undergraduate Scholarship, Appraisal Institute — Chicago, IL	2010 - 2011
Herberger Institute for Design & the Arts Scholarship, Arizona State University — Tempe, AZ	2010
Study.net Foundation Scholarship, Study.net — Fort Lauderdale, FL	2010
Dean's List *(4.00/4.00 GPA)*, Arizona State University — Tempe, AZ	2009 - 2012

Talks, Exhibits & Presentations

Emerging Technology, Countryside Angels Group, Ag Ventures Alliance — Mason City, IA	2021
Urban Planners in Technology, Alumni Panel, Columbia University — New York, NY	2021
Urban Planning Showcase, End of Year Show, Columbia University — New York, NY	2019
The Bexar Street Corridor, US Congresswoman Eddie Bernice Johnson's Office — Dallas, TX	2014
The Bexar Street Corridor, TR Hoover Community Development Corporation — Dallas, TX	2014
The Bexar Street Corridor, bcSHOPFRONT Series, bcWORKSHOP— Dallas, TX	2013
Realizing Interactive Architecture, Honors Symposium, Arizona State University — Tempe, AZ	2012

Mentorship Activities

Julia VanPutte, B.S., Operations Research, Cornell University — Ithaca, NY	2022 - Present

Business Intelligence Engineer Intern, Amazon
Professional experience from undergraduate school to industry.

Chawner Hurd, M.B.A., Business, Columbia University — New York, NY	2020 - 2023

Associate Intern, Visa
Military transition from US Army, 5th Special Forces Group to graduate school.

Michael Bollinger, B.A., Computer Science, Columbia University — New York, NY	2019 - 2023

Software Engineer Intern, Amazon
Military transition from US Army, 75th Ranger Regiment to undergraduate school.

Daniel Hineline, B.A., Political Science, Columbia University — New York, NY	2018 - 2023

Associate Intern, Guggenheim Partners
Military transition from US Army, 82nd Airborne Division to undergraduate school.

Military Service

Assignments

US Army, 75th Ranger Regiment — Fort Lewis, WA	2015 - 2016

Infantry

US Army, Ranger Training Detachment — Fort Benning, GA	2015

Ranger Assessment and Selection Program

US Army, 1st Special Warfare Training Group — Fort Bragg, NC	2014

Special Forces Assessment and Selection

US Army, 1st Special Warfare Training Group — Fort Bragg, NC	2014

Special Forces Preparation and Conditioning

US Army, 507th Parachute Infantry Regiment — Fort Benning, GA	2014

Airborne School

US Army, 19th Infantry Regiment — Fort Benning, GA	2014

Infantry School

Decorations

Expert Badge, Rifle Component Bar, US Army, 75th Ranger Regiment — Fort Lewis, WA   2016
Global War on Terrorism Service Medal, US Army, 75th Ranger Regiment — Fort Lewis, WA   2016
Driver Badge, Wheeled Vehicle Component Bar, US Army, 75th Ranger Regiment — Fort Lewis, WA   2015
Parachutist Badge, Unit Trimming, US Army, 507th Parachute Infantry Regiment — Fort Benning, GA   2014
Infantry Blue Chord Fourragère, US Army, 19th Infantry Regiment — Fort Benning, GA   2014
National Defense Service Medal, US Army, 19th Infantry Regiment — Fort Benning, GA   2014
Army Service Ribbon, US Army, 19th Infantry Regiment — Fort Benning, GA   2014

Civil Service

AmeriCorps — Dallas, TX   2013 - 2014
Volunteer in Service to America (VISTA)

Open Architecture Collaborative — Dallas, TX   2013 - 2014
Architecture & Planning

Trinity Park Conservancy — Dallas, TX   2013 - 2014
Public Park Conservation

Technical Skills

Languages

Scripting: Python, Bash
Statistical: R, Stata
Compiled: C/C++, Fortran
Database: SQL, NoSQL, Cypher
Typesetting: LaTeX, Markdown

Frameworks

Data Science: NumPy, SciPy, Pandas, statsmodels, Featuretools, Tidyverse
Visualization: Matplotlib, Seaborn, Plotly, Processing, Shiny, ggplot
Statistical Learning: Scikit-Learn, XGBoost, LightGBM, CatBoost
Reinforcement Learning: OpenAI Baselines, Stable Baselines
Deep Learning: Pytorch, TensorFlow, ONNX

Deployment

DevOps: Git, Ubuntu, Docker, CI/CD
Databases: PostgreSQL, SQLite, CosmosDB, Neo4j
Web Services: Flask, Gunicorn, Nginx
Web Automation: Selenium, Puppeteer
Cloud Platforms: Azure, Azure Gov, AWS
Security: OWASP ZAP, STIGs

Software

Development Environments: VS Code, RStudio, Jupyter
Geographic Information Systems: ArcGIS, QGIS, OSM, Leaflet, Mapbox
3D Modeling & Optimization: Rhino, Grasshopper, SketchUp, AutoCAD, Unity
Design & Illustration: Adobe Photoshop, Illustrator, InDesign
Financial Modeling: Excel, Macros, CoStar
Studio & Live Audio: Logic, Protools

Prototyping

Sensors & Hardware: Arduino, Raspberry Pi, GPU
Project Management: Agile, Scrum, Critical Path
Electrical: Soldering, Wiring, Safety
Ideation: Drawing & Sketching, Storyboarding
Analogs: Hand Drafting, Physical Modeling, Photography

Personal Activities

Music & Live Audio

Atlas North American Tour — US & Canada   2013
The Word Alive *(Fearless Records)*, Co-Tour Manager
The Word Alive *(Fearless Records)*, Guitar Tech

Fight the Silence Tour — US   2013
The Word Alive *(Fearless Records)*, Guitar Tech
For Today *(Razor & Tie Records)*, Guitar Tech

All Stars Tour — US   2012
The Word Alive *(Fearless Records)*, Guitar Tech
A Skylit Drive *(Fearless Records)*, Guitar Tech

Van's Warped Tour — US & Canada   2011
The Word Alive *(Fearless Records)*, Co-Tour Manager
Of Mice & Men *(Rise Records)*, Guitar Tech

Regional Performances — US   2011
The Rendering *(Authentik Artists)*, Guitar

Outdoors & Endurance

Running *(Half Marathon, 13.1mi, Marathon, 26.2mi)*
Cycling *(Century Ride, 100mi)*
Hiking *(Mt. Rainier, Mt. Olympus, Mt. Denali)*
Overlanding *(Rubicon Trail, Alaskan Arctic Circle, Powder River Basin, All 50 States)*
Snowboarding *(Cascades, Sierra Nevadas, Colorado Plateau, Mississippi River Valley)*