Nicholas Giangreco

Independent and collaborative translational informatician

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Topic areas: Pediatric drug safety, Explainable machine learning, Cardiovascular biomarker development, Clinical and biomedical data management/integration/ analysis

Technical expertise: Differential expression analysis, Interpretable machine learning, Statistical simulation, Data cleaning and engineering, Data-driven hypothesis generation and hypothesis testing

Programming Languages: Python, R, bash

Publications: 5 first-author manuscripts (1 published, 2 accepted, 2 in preparation), 4 collaborations, 1 on bio and medarxiv, 5 first-author posters

Team projects/Hackathons: 1 R package, 1 python package, 1 R Shiny App, 1 Dash/Plotly app, 6 analysis workflows in python, R, bash

Leadership roles: 3 club president, 2 treasurer, 1 501(c)(3) nonprofit secretary

WORK EXPERIENCE

2016 - Present	**Systems biologist** (Columbia University); New York, NY
	Thesis work includes predictive analysis and detecting risk factors of adverse clinical and biomedical outcomes
February 2021 - Present	**Bioinformatics intern** (DNAnexus); San Francisco, CA
	Product management
	Initiating internal and external projects such as interpretable machine learning and genomic/phenomic data integration/analysis
June 2019 - August 2019	**Clinical informatics intern** (Regeneron Genetics Center)); Tarrytown, NY
	Developed database of multivariate clinical associations using incremental learning on amazon web services.
July 2018 - September 2018	**Computational biology intern** (Genetic Intelligence Inc.); New York, NY
	Conducted independent and collaborative genomics research using NCBI APIs and amazon web services.
2014-2019	**Cancer bioinformatician** (National Human Genome Research Institute); Bethesda, MD
	Post-baccalaureate trainee 2014-2016; Special volunteer 2016-2019
	Investigated ovarian endometrioid tumorigenesis by integrating and analyzing RNASeq and DNA methylation sequencing (MBD-Seq).

EDUCATION

2016 - Present	**PhD Candidate, Systems Biology**; Columbia University, New York City, NY
	PhD advisor: Dr. Nicholas Tatonetti
	Masters of Arts (2018) and Masters of Philosophy (2019)
2010 - 2014	**BS, Biochemistry**; University of Rochester, Rochester, NY

PUBLICATIONS

- **Nicholas P. Giangreco** and Nicholas P. Tatonetti. Evaluating risk detection methods to uncover ontogenic-mediated adverse drug effect mechanisms in children. (accepted in BioData Mining) medRxiv doi: https://doi.org/10.1101/2021.03.10.21253302.
- **Giangreco, NP**, Elias, JE, Tatonetti, NP. No population left behind: Improving paediatric drug safety using informatics and systems biology. Br J Clin Pharmacol. 2021; 1– 7. https://doi.org/10.1111/bcp.14705.
- **Nicholas P. Giangreco**, Barry Fine, Nicholas P. Tatonetti. cohorts: A Python package for clinical 'omics data management. bioaRxiv doi: https://www.biorxiv.org/content/10.1101/626051
- Benjamin S Glicksberg, Boris Oskotsky, Phyllis M Thangaraj, **Nicholas Giangreco**, Marcus A Badgeley, Kipp W Johnson, Debajyoti Datta, Vivek A Rudrapatna, Nadav Rappoport, Mark M Shervey, Riccardo Miotto, Theodore C Goldstein, Eugenia Rutenberg, Remi Frazier, Nelson Lee, Sharat Israni, Rick Larsen, Bethany Percha, Li Li, Joel T Dudley, Nicholas P Tatonetti, Atul J Butte, PatientExploreR: an extensible application for dynamic visualization of patient clinical history from electronic health records in the OMOP common data model, Bioinformatics, Volume 35, Issue 21, 1 November 2019, Pages 4515–4518, https://doi.org/10.1093/bioinformatics/btz409.
- Benjamin S Glicksberg, Boris Oskotsky, **Nicholas Giangreco**, Phyllis M Thangaraj, Vivek Rudrapatna, Debajyoti Datta, Remi Frazier, Nelson Lee, Rick Larsen, Nicholas P Tatonetti, Atul J Butte, ROMOP: a light-weight R package for interfacing with OMOP-formatted electronic health record data, JAMIA Open, Volume

2, Issue 1, April 2019, Pages 10–14, https://doi.org/10.1093/jamiaopen/ooy059

- Estibaliz Castillero, Ziad A. Ali, Hirokazu Akashi, Nicholas Giangreco, Catherine Wang, Eric J. Stöhr, Ruping Ji, Xiaokan Zhang, Nathaniel Kheysin, Joo-Eun S. Park, Sheetal Hegde, Sanatkumar Patel, Samantha Stein, Carlos Cuenca, Diana Leung, Shunichi Homma, Nicholas P. Tatonetti, Veli K. Topkara, Koji Takeda, Paolo C. Colombo, Yoshifumi Naka, H. Lee Sweeney, P. Christian Schulze, and Isaac George American Journal of Physiology-Heart and Circulatory Physiology 2018 315:5, H1463-H1476.
- Kim-Hellmuth, S., Bechheim, M., Pütz, B., Mohammadi, P., Néd´lec, Y, Giangreco, N., et al. Genetic regulatory effects modified by immune activation contribute to autoimmune disease associations. Nat Commun 8, 266 (2017). https://doi.org/10.1038/s41467-017-00366-1.
- **Giangreco N.**, Petrykowska H., Scott A., Margolin G., Gotea V., Cho K. R., and Elnitski L. Inactivation of *Arid1a* drives aberrant epigenetic traits in a mouse model of *Apc / Pten* defective ovarian endometrioid tumors. *(in preparation)*

Peer-reviewed publications on pubmed

Google scholar profile

FELLOWSHIPS AND AWARDS

- 2021 Diversity & Inclusion Commercialization and Entrepreneurship Fellow @ Columbia Technology Ventures
- Three-Minute Thesis 2019 finalist @ Columbia Graduate School of Arts and Sciences.
- Best contribution in methodological research at the OHDSI 2018 Symposium for Pediatric Drug Safety poster.
- Columbia Diversity Fellowship.
- Department of Systems Biology Merit Fellowship.
- Donald Charles Award, University of Rochester Department of Biology.
- Fulbright Fellowship Alternate 2013-2014: Sweden, Molecular Modeling, "Novel Antibody-SpA Complex Modeling".
- Travel Award to 9th Student Council and ISMB/ECCB conference 2013 Berlin, Germany.

POSTERS AND SOFTWARE

- **Nick Giangreco** and Nicholas Tatonetti. Using precision pharmacovigilance to detect developmentally-regulated adverse drug reactions: a case study with antiepileptic drugs. poster github
- **Nick Giangreco** and Nicholas Tatonetti. Using precision pharmacovigilance to detect and evaluate antiepileptic drug associated adverse reactions in pediatric patients. poster
- **Nick Giangreco** and Nicholas Tatonetti. cohorts. github
- **Nick Giangreco**. Scan2CNV. OMICSTools
- **Giangreco N**, Zorn E, Chen E et al. Identification of novel primary graft dysfunction biomarkers using exosome proteomics [version 1; not peer reviewed]. F1000Research 2017, 6:2080 (poster) (doi: 10.7490/f1000research.1115115.1)
- **Giangreco N** and Lezon T. Alternative conformation prediction of Vibrio Cholerae concentrative nucleoside transporter. F1000Posters 2013, 4:776 (poster).

Leadership and Management Experience

- CUIMC Data Science Club
  - President 2017-
  - Organize and manage team of officers, oversee activities, manage budget, and promote outreach portfolio to support and strengthen the data science skills of biomedical scientists at CUIMC
- Health Tech Assembly
  - President 2019-2020
    - Manage business, medical, public health, and engineering representatives for inter-school events, panels, and conferences at Columbia.
    - Organize and plan professional/social engagement events.
    - Network and connect with NYC-wide entrepreneurs and professionals.
  - Medical campus representative 2018-2019
- Graduate Student Organization at Columbia University Irving Medical Center
  - Co-President 2019-2020
    - Organize and manage team of Biomedical PhDs for social and professional activities serving hundreds of CUIMC PhD students.
  - Finance Chair 2018-2019
- Columbia Graduate Council
  - Treasurer 2019-2020
    - Establish budget and expense sheets and annual reports
    - Manage forty thousand dollar budget for Columbia inter-school activities.
- Department of Biomedical Informatics
  - Co-lead weekly seminar series
  - Manage presentation schedule, speaker logistics and travel, and promote team coordination.
- Department of Systems Biology
  - Point person for Systems Biology Trainee Council
  - Secured funding and launched event portfolio for trainee development

- Manage monthly departmental happy hours
- New York Health Artificial Intelligence Society
  - 501(c)(3) not-for-profit Cofounder and Secretary
  - Meetup co-organizer 2018-
  - Promote public discourse on a wide range of topics such as AI & Society, AI & Healthcare, and economic impact by AI.
  - Organize and facilitate group engagement, workshops, AI study groups, and not-for-profit organization.
  - Consultant on data science and education projects and initiatives.
- University of Rochester Alumni Undergraduate Interviewer
  - Assess potential and suitability for undergraduate college
  - Interviewer at large and small event settings

MENTORING, TUTORING, and WRITING

- Mentor and tutor for project management, R and python programming, and statistics and machine learning to high school and college students, graduates, and professionals.
- "Hack nights – Solving healthcare data-science/AI/ML problems" Introduction to cancer genomics four part series. Co-led with Matthew Eng
  - Adventures In Hacking Healthcare Medium Publication
- Nicholas Giangreco. "The Importance of being Open". *PHDISH* January 9th 2019.
- Mentoring:
  - Payal Chandak, Undergraduate at Columbia University
    - Provide guidance and instruction in biomedical data science and research training.
    - Provided guidance and mentoring for summer 2018 research internship in the Tatonetti Lab
      - "Drugs with sex-linked risk for adverse drug reactions"
  - SMRI high school mentorship
    - Provide guidance to high school student in biomedical data science research project
- Curiology tutor
  - Managed and co-led science experiments with NIH fellows for middle school students in Washington D.C.
- College Bound tutor
  - Facilitated completion of homework assignments in STEM for Washington D.C. high school students.
- Genetics Study Group Leader, Center for Excellence in Teaching and Learning, University of Rochester.

CONFERENCES AND HACKATHONS

- Clinical Reporting of Multi 'Omics data

  - Led team and managed hackathon teams to manage and streamline integration of genomic, transcriptomic, and polygenic risk score data into the OMOP common data model. See github.
- Elixir biohackathon

  - Collaborated with bioinformatics team to integrate nextflow scheme and cancer mutation data (vcf files) into OMOP standard structure using ROMOPOmics.
- Hack for NF, Children's Tumor Foundation

  - Co-lead web developer coordination and product development
  - A FHIR-complient and primarily patient-centric profile for NF management and centralized repository for medical journey.
- Judge, Predictive analytics track, Columbia University COVID-19 Data Challenge
- Virtual Interoperathon 2020

  - Project developer for personalized health record accessed with fhir-client python api
  - Developed flask application proof-of-concept.
- NCBI Hackathon @ Carnegie Mellon University January 2020

  - Project co-lead for developing and extending common data model to represent biological 'omics data for reproducible queries and analyses.
  - See original OMOPOmics and R package ROMOPOmics github repository.
- CSHL Biological Data Science meeting November 2018.
- OHDSI 2018 Symposium
- NCBI Hackathon @ New York Genome Center August 2018

  - Project lead for developing data science notebooks and web application interfacing with drug safety data.
  - See SafeDrugs github repository.
- Intelligent Systems in Molecular Biology, July 2018
- Second Northeast Computational Health Summit, April 2018
- American Heart Association Scientific Sessions 2017, poster presentation *Giangreco et al. 2017*.
- NCBI Hackathon @ New York Genome Center June 2017.
- NCBI Hackathon @ NCBI March 2017.
- CSHL Biological Data Science meeting October 2016.
- JHU DaSH Hackathon September 2015.
- ISMB/ECCB conference @ Berlin, Germany July 2013, poster presentation *Giangreco et al. 2013*.

TALKS AND PANELS

- 2021 Graduate Scholar for research talk entitled 'Mind the developmental gap: Identifying adverse drug effects across childhood to evaluate biological mechanisms from growth and development' with Emuritus Professors at Columbia (EPIC)
- "Understanding dynamics with statistical modeling" Coding workshop, CUIMC Data Science Club, YouTube video
- "Introduction to programming and bioinformatics" Tutorial for 2021 Columbia University Science Matters Research Internship
- "Intro to Bioinformatics and How to Analyze Brain Tissue with Data Science". Invited presentation at NYC Medical Research and Bioinformatics Group. November 2018. Presentation link.
- Medical Research Career Panelist, Minds Matter NYC, June 2018
- Standardized and Reproducible Analysis Enables Identification of Novel Primary Graft Dysfunction Biomarkers using Exosome Proteomics, Second NorthEast Computational Health Summit 2018, April 2018.
- "Tools, Libraries and Analyses in Biomedical Data Science", New York Healthcare Artificial Intelligence Society, December 2017.
- "Doing Science with Big Data", Late Night Science, Columbia University Neuroscience Outreach, December 2017.
- "AI, Life Sciences, and Big Data", New York Healthcare Artificial Intelligence Society, August 2017. Presentation link.
- NIDDK Undergraduate Step-Up Judge, NIH, Bethesda MD, August 2015.

PROFESSIONAL MEMBERSHIPS

- International Society of Computational Biology, 2013-2014 & 2017-
- American Heart Association, 2017-2018.
- American Medical Informatics Association, 2017-2018.