

**BIOGRAPHICAL SKETCH**

NAME: Nicholas Giangreco Ph.D.

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eRA COMMONS USER NAME (credential, e.g., agency login): 14654270

POSITION TITLE: Quantitative Translational Scientist

EXPERTISE: Bioinformatics, Scientific Computing, Drug Safety, Systems Biology, Machine Learning

**EDUCATION/TRAINING**

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Rochester	B.S.	05/2014	Biochemistry
Columbia University	M.A.	01/2018	Systems Biology
Columbia University	M.Phil	01/2019	Systems Biology
Columbia University	Ph.D.	10/2021	Cellular, Molecular, and Biomedical Studies; Focus in Systems Biology

**A. Personal Statement**

My research and professional work focus within computational biology and precision medicine to enable data-driven decisions. My academic background in systems biology laid the foundation for my expertise in integrating multi-omics data with real-world clinical evidence. During my Ph.D., I developed computational analyses in pediatric drug safety, biomarker discovery, autoimmune and cardiovascular research, and electronic health record (EHR) standardization, leading to multiple peer-reviewed publications (11) and open-source tools (3).

Currently, as a senior data scientist in precision medicine at Regeneron Pharmaceuticals, I manage the execution of data architecture and software development projects that drive innovation in biomarker discovery and translational research. I lead the development and maintenance of nearly a dozen software packages and applications that empower clinical biomarker data monitoring and analysis. I develop automated project management and portfolio reporting tools that provide senior leadership with real-time insights into project progress and resource allocation. Additionally, I mentor interns and junior data scientists in best practices for reproducible data science, web application development, and machine learning for clinical research.

My previous and current work spans development of computational methods, data pipelines, and data driven research to better understand disease and optimize patient treatment strategies. With my experience in both academia and industry, I am well-positioned to lead efforts that translate cutting-edge automations into clinically impactful innovations.

Completed academic projects that I would like to highlight include:

NIH R01GM107145  
Tatonetti (PI)  
2016-2021

## Drug Effect Discovery Through Data Mining and Integrative Chemical Biology

UL1 TR001873

Reilly (PI)

2016-2021

Clinical and Translational Science Award

### Citations:

1. Biswas, S., Shahriar, S., **Giangreco, N. P.**, Arvanitis, P., Winkler, M., Tatonetti, N. P., Brunken, W. J., Cutforth, T., & Agalliu, D. (2022). Mural Wnt/ $\beta$ -catenin signaling regulates Lama2 expression to promote neurovascular unit maturation. *Development (Cambridge, England)*, 149(17), dev200610. <https://doi.org/10.1242/dev.200610>
2. **Giangreco, N. P.**, Lina, S., Qian, J., Kuoame, A., Subbian, V., Boerwinkle, E., Cicek, M., Clark, C. R., Cohen, E., Gebo, K. A., Loperena-Cortes, R., Mayo, K., Mockrin, S., Ohno-Machado, L., Schully, S. D., Tatonetti, N. P., & Ramirez, A. H. (2021). Pediatric data from the All of Us research program: demonstration of pediatric obesity over time. *JAMIA open*, 4(4), ooab112. <https://doi.org/10.1093/jamiaopen/ooab112>
3. Kim-Hellmuth, S., Bechheim, M., Pütz, B., Mohammadi, P., Nédélec, Y., **Giangreco, N.**, Becker, J., Kaiser, V., Fricker, N., Beier, E., Boor, P., Castel, S. E., Nöthen, M. M., Barreiro, L. B., Pickrell, J. K., Müller-Myhsok, B., Lappalainen, T., Schumacher, J., & Hornung, V. (2017). Genetic regulatory effects modified by immune activation contribute to autoimmune disease associations. *Nature communications*, 8(1), 266. <https://doi.org/10.1038/s41467-017-00366-1>

## B. Positions, Scientific Appointments, and Honors

### Positions and Scientific Appointments

2021 – Present	Senior Data Scientist, Precision Medicine, Regeneron Pharmaceuticals, Tarrytown, NY
2016 – 2021	Ph.D. Student, Department of Systems Biology, Columbia University, New York, NY
2021	Solution Science Intern, DNAnexus, San Francisco, CA
2019	Clinical Informatics Intern, Regeneron Genetics Center, Tarrytown, NY
2018	Computational Biology Intern, Genetic Leap Inc., New York, NY
2014 – 2016	Bioinformatics Trainee, National Human Genome Research Institute, Bethesda, MD
2018 – 2019	Member, Observational Health Data Sciences and Informatics (OHDSI) Consortium
2017 – 2023	Co-Founder & Secretary, New York Health Artificial Intelligence Society (501(c)(3))
2017 – 2018	Member, American Medical Informatics Association (AMIA)
2013 – 2014	Member, International Society for Computational Biology (ISCB)

### Honors

2019	Finalist, Three-Minute Thesis Competition, Columbia University
2018	Best Contribution in Methodological Research, OHDSI Symposium
2018	Travel Award, Columbia Graduate School of Arts and Sciences
2017	Columbia Diversity Fellowship
2016	Department of Systems Biology Merit Fellowship, Columbia University
2014	Donald Charles Award, University of Rochester Department of Biology
2013	Fulbright Fellowship Alternate, Sweden (Molecular Modeling)
2013	Travel Award, ISMB/ECCB Computational Biology Conference, Berlin, Germany

## C. Contributions to Science

1. **AI-Driven Precision Pharmacovigilance for Drug Safety** My graduate thesis work pioneered data-driven, biologically inspired computational approaches that leverage real-world data (RWD) to identify pediatric-specific adverse drug reactions. My work in pediatric pharmacovigilance has enhanced drug

safety monitoring by integrating safety records with transcriptomic data, reducing the risk of medication-related complications in this vulnerable population.

- a. **Giangreco, N. P.**, Elias, J. E., & Tatonetti, N. P. (2022). No population left behind: Improving paediatric drug safety using informatics and systems biology. *British journal of clinical pharmacology*, 88(4), 1464–1470. <https://doi.org/10.1111/bcp.14705>
- b. **Giangreco, N. P.**, & Tatonetti, N. P. (2021). Evaluating risk detection methods to uncover ontogenic-mediated adverse drug effect mechanisms in children. *BioData mining*, 14(1), 34. <https://doi.org/10.1186/s13040-021-00264-9>
- c. **Giangreco, N. P.**, & Tatonetti, N. P. (2022). A database of pediatric drug effects to evaluate ontogenic mechanisms from child growth and development. *Med (New York, N.Y.)*, 3(8), 579–595.e7. <https://doi.org/10.1016/j.medj.2022.06.001>

**2. Integrating Proteomics and Clinical Data to Predict Heart Disease Progression and Treatment Outcomes** Collaborations with the Columbia University Department of Cardiology and Dr. Barry Fine has included integrating proteomics data and RNASeq data with clinical records to characterize disease progression and predict adverse treatment outcomes. Additionally, through harmonization of exosome proteomics with patient-derived clinical data, we identified robust, novel blood-based biomarkers associated with primary graft dysfunction (PGD) within 24 hours of heart transplant surgery. This work enhanced the ability to identify generalizable biomarkers across geographically diverse patient cohorts, leading to more precise and individualized patient care. Importantly, we filed a patent (WO2022060842A1) for quantifying PGD risk on a per subject basis using an adaptive Monte Carlo Cross-Validation (MCCV) model.

- a. Castillero, E., Ali, Z. A., Akashi, H., **Giangreco, N.**, Wang, C., Stöhr, E. J., Ji, R., Zhang, X., Kheysin, N., Park, J. S., Hegde, S., Patel, S., Stein, S., Cuenca, C., Leung, D., Homma, S., Tatonetti, N. P., Topkara, V. K., Takeda, K., Colombo, P. C., ... George, I. (2018). Structural and functional cardiac profile after prolonged duration of mechanical unloading: potential implications for myocardial recovery. *American journal of physiology. Heart and circulatory physiology*, 315(5), H1463–H1476. <https://doi.org/10.1152/ajpheart.00187.2018>
- b. **Giangreco, N. P.**, Lebreton, G., Restaino, S., Jane Farr, M., Zorn, E., Colombo, P. C., Patel, J., Levine, R., Truby, L., Soni, R. K., Leprince, P., Kobashigawa, J., Tatonetti, N. P., & Fine, B. M. (2021). Plasma kallikrein predicts primary graft dysfunction after heart transplant. *The Journal of heart and lung transplantation: the official publication of the International Society for Heart Transplantation*, 40(10), 1199–1211. <https://doi.org/10.1016/j.healun.2021.07.001>
- c. **Giangreco, N. P.**, Lebreton, G., Restaino, S., Farr, M., Zorn, E., Colombo, P. C., Patel, J., Soni, R. K., Leprince, P., Kobashigawa, J., Tatonetti, N. P., & Fine, B. M. (2022). Alterations in the kallikrein-kinin system predict death after heart transplant. *Scientific reports*, 12(1), 14167. <https://doi.org/10.1038/s41598-022-18573-2>
- d. Barry Fine, Nicholas Tatonetti, inventors; **Nicholas Giangreco**, assignee. Systems and methods for predicting graft dysfunction with exosome proteins. US patent 63/078,672. March 24<sup>th</sup> 2022.

**3. Developing Computational Tools for Reproducible Clinical and Multi-Omics Research** To support large-scale, reproducible clinical and multi-omics research, I have developed open-source software tools that facilitate the integration, analysis, and interpretation of biomedical data. One of my key contributions is KIDSIDES, an R data package designed for mining pediatric drug safety signals. KIDSIDES contains harmonized safety records from the Food and Drug Administration to systematically identify pediatric drug safety signals. I created the PDSportal as an accessible web application of the KIDSIDES database. Additionally, I developed cohorts, a Python package that streamlines the management and analysis of multi-omics clinical data. cohorts enables the integration of genomic, transcriptomic, and proteomic datasets with structured clinical data, allowing for scalable data integration. Together these computational tools enhance data-driven research in translational medicine and clinical informatics.

- a. **Nicholas P. Giangreco**, Barry Fine, Nicholas P. Tatonetti. cohorts: A Python package for clinical 'omics data management. bioRxiv doi: <https://www.biorxiv.org/content/10.1101/626051>
- b. **Giangreco N** (2023). kidsides: Download, Cache, and Connect to 'KidSIDES'. <https://github.com/ngiangre/kidsides>, <https://ngiangre.github.io/kidsides/>, <https://nsides.io>.

**Complete List of Published Work in Pubmed:**

[https://pubmed.ncbi.nlm.nih.gov/?term=Giangreco+N&cauthor\\_id=28814792](https://pubmed.ncbi.nlm.nih.gov/?term=Giangreco+N&cauthor_id=28814792)