

# Nicolae Sapoval

PHD STUDENT · DEPARTMENT OF COMPUTER SCIENCE

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## Education

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### Rice University

PHD COMPUTER SCIENCE

- Advisor: Dr. Todd J. Treangen

Houston, TX

08/27/2019 - present

### University of Chicago

BS MATHEMATICS, BS COMPUTER SCIENCE

- Undergrad research advisor: Dr. Monisha Ghosh

Chicago, IL

09/14/2014 - 06/12/2018

## Professional Experience

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- 2019-2020 **Graduate Teaching Assistant**, Dept. of Computer Science, Rice University
- 2018-2019 **Software Consultant**, TruQua Enterprises LLC, Chicago, IL
- 2018-2019 **Undergraduate Research Assistant**, Dept. of Biological Sciences, University of Chicago
- 2016-2018 **Undergraduate Research Assistant**, Dept. of Computer Science, University of Chicago
- 2015-2018 **Undergraduate Teaching Assistant**, Dept. of Computer Science, University of Chicago

## Publications

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### ARTICLES AND PREPRINTS

89 citations

- Sapoval, N.**, Lou, E., Hopkins, L., Ensor, K.B., Schneider, R., Treangen, T.J., Stadler, L.B. “Enhanced Detection of Recently Emerged SARS-CoV-2 Variants of Concern in Wastewater”. 2021. [medRxiv:10.1101/2021.09.08.21263279]. 1 citation
- Adenaiye, O.O., Lai, J., de Mesquita, P.J.B., Hong, F.H., Youssefi, S., German, J.R., Tai, S.H.S., Albert, B.J., Schanz, M., Weston, S., Hang, J., Fung, C., Chung, H. K., Coleman K. K., **Sapoval, N.**, Treangen, T.J., Maljkovic Berry, I., Mullins, K., Frieman, M., Ma, T., Milton, D. K. “Infectious SARS-CoV-2 in Exhaled Aerosols and Efficacy of Masks During Early Mild Infection”. *Clinical Infectious Diseases* (2021). [DOI:10.1093/cid/ciab797, medRxiv:10.1101/2021.08.13.21261989] 12 citations
- Gallego-García, P., Varela, N., Estévez-Gómez, N., De Chiara, L., Fernández-Silva, I., Valverde, D., **Sapoval, N.**, Treangen, T.J., Regueiro, B., Cabrera-Alvargonzález, J.J. and del Campo, V. “Limited genomic reconstruction of SARS-CoV-2 transmission history within local epidemiological clusters”. 2021. [medRxiv:10.1101/2021.08.08.21261673]. *Submitted to Virus Evolution*.
- McDonald, J.T., Enguita, F.J., Taylor, D., Griffin, R.J., Priebe, W., Emmett, M.R., McGrath, M., Sajadi, M., Harris, A.D., Clement, J. and Dybas, J.M., Aykin-Burns, N., Guarnieri, J.W., Singh, L.N., et al. “Role of miR-2392 in driving SARS-CoV-2 infection”. 2021. *Cell Reports* (2021): 109839. [DOI:10.1016/j.celrep.2021.109839, bioRxiv:10.1101/2021.04.23.441024]. 2 citations
- Balaji, A., **Sapoval, N.**, Seto, C., Elworth, R.A.L., Nute, M. G., Savidge, T., Segarra, S., Treangen, T.J. “KOMB: Graph-Based Characterization of Genome Dynamics in Microbial Communities”. 2021. [bioRxiv:10.1101/2020.05.21.109587v2]. *Under review at PLoS Comp. Bio.* 1 citation
- Kille, B., Liu, Y., **Sapoval, N.**, Nute, M., Rauchwerger, L., Amato, N., Treangen, T. “Accelerating SARS-CoV-2 low frequency variant calling on ultra deep sequencing datasets”. 20th IEEE International Workshop on High Performance Comput. Bio. (HiCOMB’21). [arXiv:2105.03062]
- Mc Cartney, A.M., Mahmoud, M., Jochum, M., Agostinho, D.P., Zorman, B., Al Khleifat, A., Dabbaghie, F., Kesharwani, R.K., Smolka, M., Dawood, M. and Albin, D. et al. “An international virtual hackathon to build tools for the analysis of structural variants within species ranging from coronaviruses to vertebrates”. *F1000Research* 10, no. 246 (2021): 246. [DOI:10.12688/f1000research.51477.1] 1 citation
- Sapoval, N.**, Mahmoud, M., Jochum, M., Liu, Y., Elworth, R. A. L., Wang, Q., Albin, D., Ogilvie, H., Lee, M., Villapol, S., Hernandez, K., Maljkovic Berry, I., Foux, J., Beheshti, A., Ternus, K., Aagaard, K., Posada, D., Mason, C., Sedlazeck, F., Treangen,

T. "SARS-CoV-2 genomic diversity and the implications for qRT-PCR diagnostics and transmission". *Genome Res.* 31, no. 4 (2021): 635-644. [DOI:10.1101/gr.268961.120] 25 citations

da Silveira, Willian A., Hossein Fazelinia, Sara Brin Rosenthal, Evagelia C. Laiakis, Man S. Kim, Cem Meydan, Yared Kidane et al. "Comprehensive Multi-omics Analysis Reveals Mitochondrial Stress as a Central Biological Hub for Spaceflight Impact". *Cell* 183, no. 5 (2020): 1185-1201. [DOI:10.1016/j.cell.2020.11.002] 46 citations

## SUBMITTED

**Sapoval, N.**, de Mesquita, P.J.B., Liu, Y., Wang, R., Liu, T.R., Garza, J., Williams, T., Cadiz, C., Tan, G.S., Van Bakel, H., Elworth, R.A.L., EMIT Investigators, Milton, D.K., Treangen, T.J. "Intrahost-diversity of influenza A virus in upper and lower respiratory tract derived samples from a college community". 2021. *Submitted to Virus Evolution*.

**Sapoval, N.\***, Aghazadeh, A.\* , Antunes, D.A., Balaji, A., Baraniuk, R., Barberan, C.J., Dannenfelser, R., Dun, C., Edrisi, M., Elworth, R.A.L., Kille, B., Kyrillidis, A., Nakhleh, L., Nute, M.G., Wolfe, C.R., Yan, Z., Yao, V., Treangen, T.J. "A Practical Guide to Deep Learning across Computational Biology: Recent Progress, Current Limitations, and Future Perspectives". 2021. *Accepted at Nature Communications*.

## IN PREP

**Sapoval, N.**, Prabhakaran, R., Agostinho, D., Liu, Y., Sedlazeck, F., Treangen, T.J. "cov2db: An interactive comprehensive database of SARS-CoV-2 low frequency genomic variants.". 2021.

## Awards, Fellowships, & Grants

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2021 **Pan-Structural Variation Hackathon in the Cloud: First Prize**, Baylor College of Medicine

2019 **Undergraduate Student Travel Award**, Biophysical Society  
**Undergraduate Poster Competition Award**, Biophysical Society

2018 **Numbers Game Challenge Winner**, Optiver

2014 **Bronze Medal**, International Mathematical Olympiad  
**Silver Medal**, Balkan Mathematical Olympiad

2013 **Honorable Mention**, International Mathematical Olympiad  
**Bronze Medal**, Balkan Mathematical Olympiad

2012 **Bronze Medal**, International Mathematical Olympiad

## Presentations

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\* *presenting author*

### INVITED TALKS

March 2021. *SARS-CoV-2 genomic diversity and the implications for qRT-PCR diagnostics and transmission*. Invited talk: Center for Translational Data Science (CTDS) Symposium, University of Chicago, Chicago, IL.

### CONTRIBUTED PRESENTATIONS

**Sapoval, N.\***, OliVar: Variant-aware, push-button primer and probe design for SARS-CoV-2. ASM NGS Conference, Virtual. 2020.

**Sapoval, N.\***, Liu, Y., Elworth, R. A. L., Michael, N., Sedlazeck, F., Treangen, T. Mining SARS-CoV-2 interhost and intrahost genomic variation. Oral presentation: Ken Kennedy Institute Data Science Conference, Houston, TX. 2020.

**Sapoval, N.\***, Haddadian, E., Tang, W.-J. A new open structure of the insulin degrading enzyme provides insights into the conformational transition of the molecule. Poster: Biophysical Society Annual Meeting, Baltimore, MD. 2019.

Ghosh, M.\* , **Sapoval, N.**, Mahmud S. K. Coexistence of Wi-Fi and WAVE in the DSRC spectrum: impact on WAVE latency and throughput. Oral presentation: WCX'18: SAE World Congress Exp., Detroit, MI. 2018.

**Sapoval, N.\***, Ghosh, M. Coexistence of Wi-Fi and WAVE in the DSRC spectrum. Poster: University of Chicago Undergraduate Research Symposium, Chicago, IL. 2017.

## Teaching Experience

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Fall 2020	<b>Reasoning about Algorithms</b> , Teaching Assistant	<i>Houston, TX</i>
Fall 2019	<b>Reasoning about Algorithms</b> , Teaching Assistant	<i>Houston, TX</i>
Winter 2018	<b>C Programming</b> , Teaching Assistant	<i>Chicago, IL</i>
Winter 2017	<b>Honors Intro to Computer Science II</b> , Teaching Assistant	<i>Chicago, IL</i>
Winter 2016	<b>Honors Intro to Computer Science II</b> , Teaching Assistant	<i>Chicago, IL</i>

## Mentoring

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2021	<b>HackRice</b> , Mentor	<i>Houston, TX</i>
2021	<b>Summer STEM Institute</b> , Research mentor	<i>Virtual</i>
2020	<b>Mary Brady</b> , Undergraduate Research Project: Transmission analysis toolkit, Rice University	<i>Houston, TX</i>
2020	<b>Hung Hguyen, Audrey Deigaard</b> , Genome Sleuths Summer REU , Rice University	<i>Houston, TX</i>
2020	<b>Abdelrahman Abouzeid</b> , Undergraduate Research Project: Feline infectious peritonitis diagnostics, Rice University	<i>Houston, TX</i>

## Outreach & Professional Development

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### SERVICE AND OUTREACH

2021	<b>Computer Science Graduate Student Association</b> , President	<i>Houston, TX</i>
2020	<b>Rice Undergraduate Research Symposium</b> , Volunteer Judge	<i>Houston, TX</i>
2019-2020	<b>Computer Science Graduate Student Association</b> , Social chair	<i>Houston, TX</i>

### DEVELOPMENT

**Pan-Structural Variation Hackathon, 2021**, attended a four-day research hackathon hosted by Baylor College of Medicine as a part of NCBI Hackathons initiative. Worked on a database of low frequency variants for SARS-CoV-2.

**Hands-on SARS-CoV-2 Genome Analysis Workshop**, co-lead a session on reference guided-assembly and low frequency variant calling for SARS-CoV-2. Assisted attendees with practical session and presented workflows in an interactive setting.

**Pan-Structural Variation Hackathon, 2020**, attended a four-day research hackathon hosted by Baylor College of Medicine as a part of NCBI Hackathons initiative. Worked on copy number variation and structural variation linking problems in human genomics.

**Ken Kennedy Institute Machine Learning Bootcamp**, attended a two-day workshop on machine learning with focus towards reinforcement learning and applications in data science.

**The Workshop on ns-3 (WNS3)**, attended a hands-on workshop on network simulations as a part of undergraduate research training experience.