

# Jonathan Colen

## Curriculum Vitae

### Contact

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### Experience

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**Research Assistant Professor**    Old Dominion University      2023-Present  
ODU-JLab Joint Institute for Advanced Computing

**Graduate Research Assistant**    University of Chicago      2018-2023  
Department of Physics  
James Franck Institute  
Kadanoff Center for Theoretical Physics

**Undergraduate Research Assistant**    University of Virginia      2016-2018  
Department of Physics  
Department of Radiation Oncology

**Intern**

US Naval Research Laboratory      2018  
NASA Langley Research Center      2017  
The MITRE Corporation      2013-2015

**Ranger**    Philmont Scout Ranch      2015-2016

### Education

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**Ph.D. in Physics**      2018-2023  
University of Chicago  
*Thesis advisor:* Vincenzo Vitelli  
*Thesis title:* Learning physical models of biological materials

**S.M. in Physics**      2018-2019  
University of Chicago

**B.S. in Computer Science**      2014-2018  
University of Virginia, With Highest Distinction

## Publications

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13. Harmonization to preserve clinical variability in CT-based radiomics for lung cancer  
C. Huchthausen, M. Shi, G. Andrade de Sousa, **J. Colen**, E. Shelley, J. Larner, and K. Wijesooriya. In Review
12. Interpreting neural operators: how nonlinear waves propagate in non-reciprocal solids  
**J. Colen\***, A. Poncet\*, D. Bartolo, and V. Vitelli. In Review. **ArXiv**: 2404.12918 (2024).
11. Sociohydrodynamics: data-driven modelling of social behavior  
D. Seara, **J. Colen**, M. Fruchart, Y. Avni, D. Martin, and V. Vitelli. In Revision. **ArXiv**: 2312.17627 (2023).
10. Learning a conserved mechanism for early neuroectoderm morphogenesis  
M. Lefebvre\*, **J. Colen\***, N. Claussen\*, F. Brauns, M. Raich, N. Mitchell, M. Fruchart, V. Vitelli, and S. Streichan. In Revision. **BioRxiv**: 2023.12.22.573058 (2023).
9. Predicting radiation-induced immune suppression in lung cancer patients treated with stereotactic body radiation therapy  
**J. Colen\***, C. Nguyen\*, S.W. Liyanage, E. Aliotta, J. Chen, C.E. Alonso, K. Romano, S. Peach, T. Showalter, P. Read, J. Larner, and K. Wijesooriya. In Revision.
8. Motor crosslinking augments elasticity in active nematics  
S.A. Redford, **J. Colen**, J.L. Shivers, S. Zemsky, M. Molaei, C. Floyd, P. Ruijgrok, V. Vitelli, Z. Bryant, A.R. Dinner, and M.L. Gardel. **Soft Matter** 20(11), (2024)
7. Machine learning interpretable models of cell mechanics from protein images  
M. Schmitt\*, **J. Colen\***, S. Sala, J. Devany, S. Seetharaman, A. Caillier, M.L. Gardel, P.W. Oakes, and V. Vitelli. **Cell** 187(2), (2024)
6. Negative group velocity and Kelvin-like wake pattern  
E.B. Kolomeisky, **J. Colen**, and J.P. Straley. **Phys. Rev. B** 105(5), (2022).
5. PINT: A modern software package for pulsar timing  
J. Luo, S. Ransom, P. Demorest, P.S. Ray, A. Archibald, M. Kerr, R.J. Jennings, M. Bachetti, R. van Haasteren, C.A. Champagne, **J. Colen**, C. Phillips, J. Zimmerman, K. Stovall, M.T. Lam, and F.A. Jenet. **Astrophys. J.** 911(1), (2021)
4. Machine learning active-nematic hydrodynamics  
**J. Colen\***, M. Han\*, R. Zhang, S.A. Redford, L.M. Lemma, L. Morgan, P.V. Ruijgrok, R. Adkins, Z. Bryant, Z. Dogic, M.L. Gardel, J.J. De Pablo, and V. Vitelli. **PNAS** 118(10), (2021)
3. Kelvin-Froude wake patterns of a traveling pressure disturbance  
**J. Colen** and E.B. Kolmeisky. **Eur. J. Mech. B. Fluids** 85, 400-412, (2021)
2. PINT: High-precision pulsar timing analysis package  
J. Luo, S. Ransom, P. Demorest, R. van Haasteren, P.S. Ray, K. Stovall, M. Bachetti, A. Archibald, M. Kerr, **J. Colen**, and F. A. Jenet. **ASCL** 1902.007, (2019).
1. Elastic and electronic tuning of magnetoresistance in MoTe<sub>2</sub>.  
J. Yang, **J. Colen**, J. Liu, M.C. Nguyen, G.W. Chern, and D. Louca. **Sci. Adv.** 3(12), (2017)

## Conferences and Presentations

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Learning how genetic patterns and protein dynamics govern morphogenesis. APS March Meeting, March 20-22, 2023. Virtual.

Machine learning approaches to biomechanics. APS March Meeting, March 14-18, 2022. Chicago, IL.

Machine learning for bio-active matter. JFI Emerging Frontiers Seminar. November 15, 2021. University of Chicago, Chicago IL.

Machine learning active-nematic hydrodynamics. APS March Meeting. March 15-19, 2021. Virtual.

Photon vs proton therapy comparison of clinically significant dosimetric parameters that lead to radiation induced toxicity in Lung SBRT. Joint AAPM COMP Meeting, July 12-16, 2020. Virtual

Modeling lymphocyte loss following radiation therapy treatments: A machine learning approach. ICCR-MCMA. June 17-21, 2019. Montreal, Canada.

Clinical significance of treatment related lymphopenia in lung SBRT and a method to ameliorate them. ESTRO 38. April 26-30, 2019. Milan, Italy.

Simulating lymphotoxicity in lung SBRT: treatment planning considerations. MAC-AAPM Fall Annual Meeting. October 5-6, 2018. Richmond, VA.

## Teaching

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### University of Chicago Teaching Assistant

Environmental Data Science Bootcamp	Fall 2020, 2021
Soft Matter Physics	Spring 2021
Introduction to Mathematical Methods of Physics	Spring 2019
Honors Mechanics	Fall 2018

### University of Virginia Teaching Assistant

Introduction to Condensed Matter Physics	Fall 2017
General Physics I: Mechanics	Spring 2017
Widely Applied Physics	Fall 2016
Modern Physics	Fall 2016

## Patents

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System, Method and Computer Readable Medium to Estimate the Post-Treatment Blood Cell Sub Type Count in Patients Treated via Radiation Therapy. US 2021/0335496 A1. Patent pending

## Honors

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<b>Bascom S. Deaver Scholarship</b> UVA Department of Physics	2017
<b>L. Frazier Fall Scholarship</b> UVA School of Engineering and Applied Sciences	2017
<b>Outstanding Undergraduate Research Award</b> University of Virginia	2017
<b>Intermediate Honors</b> University of Virginia	2016
<b>Demonstrated Innovation Award</b> The MITRE Corporation	2013

## Other activities

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**Reviewer for** Science Advances, Biophysical Journal, PRX Life

AI+Science Summer School, University of Chicago Data Science Institute, August 8-12, 2022.

Learning Dynamical Models from Biophysical Data, Aspen Center for Physics, June 19-26, 2022.

Princeton Deep Learning Theory Summer School, July 27-August 4 2021.