

Nicholas Drachman
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EDUCATION

PhD in Physics, Brown University, 2024

B.S. in Physics, Boston College, 2014

AWARDS & HONORS:

- GFSD Fellowship, 2021-2024
- Ruth and William Silen, M.D. Award, First Prize, 2019
- IMSD Fellowship, 2018
- Brown DIAP Fellowship, 2017
- Undergraduate Summer Research Fellowship, 2012 & 2013

WORK EXPERIENCE:

Graduate Research Fellow, NIST – Cooksey Lab	9/21 to 10/24
Graduate Researcher, Brown University – Stein Lab	9/17 to 10/24
Research Specialist, University of Pennsylvania – Functional/Metabolic Imaging Group	3/15 to 5/17
Undergraduate Research Fellow, Boston College – Naughton Lab	4/13 to 5/14
Undergraduate Research Fellow, Boston College – Ren Lab	4/12 to 11/12

PUBLICATIONS:

- **Drachman, N.**, Lepoitevin, M., Szapary, H., Wiener, B., Maulbetsch, W., Stein, D., "Nanopore ion sources deliver single amino acid and peptide ions directly into high vacuum", *Nature Communications*, 15, 7709 (2024).
- **Drachman, N.**, Vietorisz, J., Winchester, A.J., Vest, R., Cooksey, G.A., Pookpanratana, S., Stein, D., "Photolysis of the peptide bond at 193 nm and 222 nm", *Journal of Chemical Physics* (2024), *Under review*.
- Cooksey, G., Iavarone-Garza, S., **Drachman, N.**, Patrone, P., Accuracy and dynamics of flow measurements to 1 nL/min using an optofluidic flow meter, *Measurement: Sensors*, (2024), *In press*.
- **Drachman, N.**, Patrone, P., Cooksey, G., Relaxation times and dynamic behavior of an optofluidic flow meter in the nanoliter per minute regime, *Physics of Fluids*, 36, 022029 (2024).
- Alfaro, J., ..., **Drachman, N.**, ..., et al., "The emerging landscape of single molecule protein sequencing technologies", *Nature Methods*, 18, 604–617 (2021).
- **Drachman, N.**, Kadlecsek S.J., Rizi, R.R., "Quantifying reaction kinetics of the non-enzymatic decarboxylation of pyruvate and production of peroxy-monocarbonate with hyperpolarized ^{13}C -NMR", *Phys. Chem. Chem. Phys.*, 19(29), 19316-19325 (2017).
- **Drachman, N.**, Kadlecsek, S.J., Pourfathi, M., Xin, Y., Profka, H. and Rizi, R.R., "In vivo pH mapping of injured lungs using hyperpolarized $[1-^{13}\text{C}]$ pyruvate" *Magn. Reson. Med.* 78 (3), 1121-1130 (2017).
- Pourfathi M., Xin, Y., Kadlecsek, S.J., Cereda, M., Profka, H., Hamedani, H., Siddiqui, S., Ruppert, K., **Drachman, N.**, Rajaei, J.N., Rizi, R.R., "In vivo imaging of the progression

of acute lung injury using hyperpolarized [$1\text{-}^{13}\text{C}$] pyruvate", *Magn. Reson. Med.* 78 (6), 2106-2115 (2017).

- Siddiqui, S., Kadlecsek, S.J., Pourfathi, M., Xin, Y., Mannhertz, W., Hamedani, H., **Drachman, N.**, Ruppert, K., Clapp, J., Rizi, R.R., "The use of hyperpolarized carbon-13 magnetic resonance for molecular imaging", *Adv. Drug Deliv. Rev.*, 113, 3-23 (2017).

PRESENTATIONS & CONFERENCE PROCEEDINGS:

- **Drachman, N.**, Stein, D., "The nanopore ion source emits amino acid and peptide ions directly into vacuum from a nanoscale aqueous meniscus" Oral presentation, *American Society of Mass Spectrometry*, 2024, San Diego, CA.
- **Drachman, N.**, Cooksey, G., Patrone, P., Sadeghi, J., Stein, D., "Dynamic Measurements of sub-nL/min flows with an optofluidic flowmeter" Oral presentation, *APS March Meeting*, 2023, Las Vegas, NV.
- **Drachman, N.**, Vietorisz, J., Stein, D., "UV photodissociation of peptides for Nanopore MS sequencing", Oral presentation, *Single Molecule Protein Sequencing*, 2022, Delft, Netherlands.
- **Drachman, N.**, "Nanopore ion sources deliver ions directly into high vacuum --- applications to single molecule protein sequencing", Invited oral presentation, *Nanopore Weekly Meeting*, 2023, virtual.
- **Drachman, N.**, "Physical properties of the nanopore ion source", Oral presentation, *APS March Meeting*, 2022, Chicago, IL.
- **Drachman, N.**, "Nanopore mass spectrometry for single molecule protein sequencing – the role of low flow rates", Invited oral presentation, *NIST Physical Measurement Lab Seminar*, 2021, virtual.
- **Drachman, N.**, Stein, D., "A single-molecule mass spectrometer for protein sequencing", Oral presentation, *APS March Meeting*, 2021, virtual.
- **Drachman, N.**, Stein, D., "Single-Molecule Sensitivity in Mass Spectrometry Using Nanopore Ion Sources", Oral presentation, *APS March Meeting*, 2020, Denver, CO. (*cancelled due to COVID*)
- **Drachman, N.**, Weiner, B., Stein, D., "Designing a Nanopore Mass Spectrometer for Protein Sequencing", Oral presentation, *Single Molecule Protein Sequencing 2019*, Jerusalem, Israel.
- **Drachman, N.**, Lepoitevin, M., Weiner, B., Szapary, H., Stein, D., "Towards Single-Molecule Protein Sequencing via Nanopore Mass Spectrometry", Oral presentation, *New England Science Symposium 2019*, Harvard Medical School, Boston, MA.
- **Drachman, N.**, Lepoitevin, M., Weiner, B., Szapary, H., Isik, O.G. Stein, D., "Towards Single Molecule Protein Sequencing by Nanopore Mass Spectrometry", Oral presentation, *APS March Meeting*, 2019, Boston, MA.
- **Drachman, N.**, Kadlecsek, S.J., Hamedani, H., Pourfathi, M., Siddiqui, S., Xin, Y., Profka, H., Duncan, I., Rizi, R.R., "Assessing Gas Exchange via Co-Administration of Hyperpolarized [$1\text{-}^{13}\text{C}$]-Pyruvate and ^{13}C -Bicarbonate", Poster, *American Thoracic Society Conference*, 2017, Washington DC.
- **Drachman, N.**, Kadlecsek, S.J., Rizi, R.R., "Analyzing Reaction Dynamics with Hyperpolarized ^{13}C -NMR", Poster, *ISMRM 2017*, Honolulu, HI.
- **Drachman, N.**, "Improving pH Imaging by Monitoring Organic Reactions with

Hyperpolarized ^{13}C -NMR", Invited Oral presentation, University of Cincinnati, Center for Pulmonary Imaging Research, 2016, Cincinnati, OH.

- **Drachman, N.**, Kadlecek, S., Pourfathi, M., Xin, Y., Profka, H., and Rizi, R.R., "In Vivo pH and Metabolite MR Imaging Using Hyperpolarized ^{13}C -Pyruvate", Oral presentation, *International Society for Magnetic Resonance in Medicine Conference*, 2016, Singapore.
- **Drachman, N.**, Kadlecek, S., Xin, Y., and Rizi, R.R., "pH Dependent Kinetics of the Decarboxylation of Pyruvate for pH Mapping Experiments", Poster. *International Society for Magnetic Resonance in Medicine Conference*, 2016, Singapore.
- **Drachman, N.**, Kadlecek, S., Pourfathi, M., Xin, Y., Profka, H. and Rizi, R.R., "Simultaneous Measurement of pH and Metabolism in Injured Rat Lungs Using Hyperpolarized ^{13}C Carbon MRI", Poster, *American Thoracic Society Conference*, 2016, San Francisco, CA.
- **Drachman, N.**, "In Vivo pH and Metabolite MR Imaging Using Hyperpolarized ^{13}C -Pyruvate", Oral presentation. *The Fourth International Workshop on Hyperpolarized Carbon-13 and Its Applications in Metabolic Imaging*, 2016, Philadelphia, PA.
- **Drachman, N.**, Kadlecek, S.J., Pourfathi, M., Xin, Y., Profka, H., and Rizi, R.R., "In Vivo pH Imaging in the Lungs Using Hyperpolarized $[1-^{13}\text{C}]$ Pyruvate", Poster, *41st Annual Eugene P. Pendergrass Symposium*, 2016, Philadelphia, PA.
- **Drachman, N.**, Calm, Y., Naughton, M.J., "Investigation of Plasmonic and Optical Properties of Ag Nanowires", Poster, *APS New England Meeting*, 2014, Boston, MA.