

Ryan M. Williams, Ph.D.

Assistant Professor of Biomedical Engineering
The City College of New York
275 Convent Ave., New York, NY 10031
E: rwilliams4@ccny.cuny.edu
P: 212.650.5209

Positions Held and Education

The City College of New York

Assistant Professor, Biomedical Engineering
Head, Immune Nanomedicine Laboratory

August 2019-Present

Memorial Sloan Kettering Cancer Center

Postdoctoral Research Fellow, Molecular Pharmacology

Mentor: Daniel Heller, Ph.D., Molecular Pharmacology Program

Targeted drug delivery for renal disease; Implantable nanosensor development

May 2013-August 2019

West Virginia University

Ph.D., Pharmaceutical and Pharmacological Sciences

Mentor: Letha J. Sooter, Ph.D., Basic Pharmaceutical Sciences Department

Dissertation: "Investigations in Molecular Recognition Element Selection and Single-Wall Carbon Nanotube Properties"

August 2008-April 2013

University of Virginia

B.A., Biology

Lab Mentor: Edmund Brodie III, Ph.D., Department of Biology

Evolutionary genetics of Caribbean lizard species

August 2004-May 2008

September 2006-May 2008

Awards and Honors

- Ovarian Cancer Research Alliance Schreiber Prize for Outstanding
Mentored Investigators 2019
- American Heart Association Postdoctoral Fellowship 2017-2019
- Ovarian Cancer Research Fund Mentored Investigator Award 2016-2018
- Postdoctoral Fellow Travel Award, Excited State Processes in
Electronic and Bio Nanomaterials 2018
- American Association of Pharmaceutical Scientists Postdoctoral Fellow Award 2017
- Weill Cornell Cancer Pharmacology Training Grant, Funding Declined 2017-2018
- Best Pre-Clinical Paper Travel Award, World Molecular Imaging Congress 2016
- Weill Cornell Medicine Bench to Bedside Entrepreneurship Initiative
 - 1st place team business plan competition 2015
 - 2nd place team business plan competition 2014
- American Foundation for Pharmaceutical Education Pre-Doctoral Fellowship 2011-2013

• WVNano Graduate Fellowship Program (NSF)	2011-2013
• Travel Award, AIChE Society for Biological Engineering Conference	2012
• Rho Chi National Pharmacy Honor Society, Alpha Mu Chapter	2012
• Cancer Nanotechnology STEM Fellowship, Funding Declined	2011
• George M. Cruise Foundation Scholarship, First Community Bank	2004-2012
• Ethel N. Bowen Foundation Scholarship, First Century Bank	2004-2012
• Cleo Lawson Mitchell Foundation Scholarship	2004-2008
• Lions Club of Bluefield, Va. Scholarship	2004
• Madhu Chopra Memorial Foundation Scholarship	2004
• Peacemaker's Scholarship Foundation	2004
• Gift of Hope 21 st Century Scholars Program	2004

Publications (23: 2 submitted/in prep, 11 first author, 3 review, 7 co-author)

Submitted/In Preparation

Williams RM, Shah J, Mercer E, Tian HS, Dorso M, Jaimes EA, and Heller DA. Renal peritubular capillary transcytosis of mesoscale nanoparticles mediates therapy of acute kidney injury. *bioRxiv Preprint* doi: <https://doi.org/10.1101/2020.01.24.919134> (2020).

Williams RM, Harvey JD, Budhathoki-Upreti J, and Heller DA. Small-molecule based optical detection of the protein glutathione S-transferase. In preparation.

Published

Han SJ, **Williams RM**, D'Agati VD, Jaimes EA, Heller DA, and Lee HT. (2020) Selective nanoparticle-mediated targeting of renal tubular TLR9 attenuates ischemic acute kidney injury. *Kidney International* In Press.

Harvey JD*, **Williams RM***, Tully KM, Baker HA, Shamay Y, and Heller DA. (2019) An in vivo nanosensor measures compartmental doxorubicin exposure. *Nano Letters* 19: 4343-4354; DOI: 10.1021/acs.nanolett.9b00956. (* co-first authors)

Williams RM, Lee, C, and Heller DA. (2018) A fluorescent carbon nanotube sensor detects the metastatic prostate cancer biomarker uPA. *ACS Sensors* 3: 1838-1845. DOI: 10.1021/acssensors.8b00631

Williams RM, Lee C, Galassi TV, Harvey JD, Leicher R, Sirenko M, Dorso M, Shah J, Olvera N, Dao F, Levine DA, and Heller DA. (2018) Non-invasive ovarian cancer biomarker detection via an optical nanosensor implant. *Science Advances* 4: eaaq1090; DOI: 10.1126/sciadv.aaq1090

Williams RM, Shah J, Tian HS, Chen X, Geissmann F, Jaimes EA, and Heller DA. (2018) Selective nanoparticle targeting of the renal tubules. *Hypertension* 71: 87-94; DOI: 10.1161/HYPERTENSIONAHA.117.09843 [**Highlighted** in Perspective: Yap *et al.* (2018) *Hypertension* 71: 61-63]

- Harvey JD, Jena PV, Baker HA, Zerze GH, **Williams RM**, Galassi TV, Roxbury D, Mittal J, and Heller DA. (2017) A carbon nanotube reporter of miRNA hybridization events in vivo. *Nature Biomedical Engineering* 1: 0041. DOI: 10.1038/s41551-017-0041 [**Highlighted** in News and Views: Lazaro and Kostarelos (2017) *Nature Biomedical Engineering* 1: 0063]
- Budhathoki-Uprety J, Harvey JD, Isaac E, **Williams RM**, Galassi TV, Langenbacher RE, and Heller DA. (2017) Polymer cloaking modulates the carbon nanotube protein corona and delivery in cancer cells. *Journal of Materials Chemistry B* 5: 6637-6644. DOI: 10.1039/C7TB00695K
- Williams RM**, Jaimes EA, and Heller DA. (2016) Nanomedicines for kidney diseases. *Kidney International* 90:740-745. DOI: 10.1016/j.kint.2016.03.041
- Williams RM**, Shah J, Ng BD, Minton DR, Gudas LJ, Park CY, and Heller DA. (2015) Mesoscale nanoparticles selectively target the renal proximal tubule epithelium. *Nano Letters* 15(4): 2358-2364, DOI: 10.1021/nl504610d
- Hong KL, Imlay K, Battistella L, **Williams RM**, Hickey K, Bostick C, Gannett PM, and Sooter LJ. (2015) Selection of single-stranded DNA molecular recognition elements against Exotoxin A using a novel Decoy-SELEX method and sensitive detection of Exotoxin A in human serum. *BioMed Research International* 2015: 417641, DOI: 10.1155/2015/417641
- Roxbury D, Jena PV, **Williams RM**, Enyedi B, Niethammer P, Marcet S, Verhaegen M, Blais-Ouellette S, and Heller DA. (2015) Hyperspectral Microscopy of Near-Infrared Fluorescence Enables 17-Chirality Carbon Nanotube Imaging. *Scientific Reports* 5: 14167. DOI: 10.1038/srep14167
- Williams RM** and Sooter LJ. (2015) *In vitro* selection of cancer cell-specific molecular recognition elements from amino acid libraries. *The Journal of Immunology Research* 2015: 18686, DOI: 10.1155/2015/186586
- Hong KL, Maher E, **Williams RM**, and Sooter LJ. (2015) *In vitro* selection of single-stranded DNA molecular recognition elements against Toxin B and sensitive detection in human fecal matter. *The Journal of Nucleic Acids* 2015:808495, DOI: 10.1155/2015/808495
- Hong KL, Battistella L, Salva AD, **Williams RM**, and Sooter LJ. (2015) *In vitro* selection of single-stranded DNA molecular recognition elements against *S. aureus* alpha toxin and sensitive detection in human serum. *International Journal of Molecular Sciences* 16(2): 2794-2809, DOI:10.3390/ijms16022794
- Williams RM**, Kulick AR, Yedlapalli S, Battistella L, Hajiran CJ, Sooter LJ. (2014) Isolation of single-stranded DNA molecular recognition elements against bromacil. *The Journal of Nucleic Acids* 2014: 102968, DOI: 10.1155/2014/102968
- Williams RM**, Hajiran CJ, Nayeem S, and Sooter LJ. (2014) Identification of an antibody fragment molecular recognition element specific for androgen-dependent prostate cancer

cells. *BMC Biotechnology* 14:81, DOI: 10.1186/1472-6750-14-81 [Highlighted as Editor's Pick]

Williams RM, Maher E, and Sooter LJ. *In vitro* selection of a ssDNA molecular recognition element for the pesticide malathion. (2014) *Combinatorial Chemistry & High Throughput Screening* 17(8): 694-702, DOI: 10.2174/1386207317666140827123631

Williams RM, Taylor H, Thomas J, Hines B, and Sooter LJ. (2014) The effect of DNA- and sodium cholate-dispersed single wall carbon nanotubes on the green algae *Chlamydomonas reinhardtii*. *The Journal of Nanoscience* 2014:419382, DOI: 10.1155/2014/419382

Williams RM, Carihfield CL, Gattu S, Holland LA, and Sooter LJ. (2014) *In vitro* selection of a single-stranded DNA molecular recognition element against atrazine. *International Journal of Molecular Sciences* 15(8): 14332-14347, DOI: 10.3390/ijms150814332

Williams RM, Nayeem S, Hines B, and Sooter LJ. (2014) The effect of DNA-dispersed single-wall carbon nanotubes on the polymerase chain reaction. *PLoS ONE* 9(4): e94117, DOI:10.1371/journal.pone.0094117

Williams RM and Naz RK. (2010) Novel biomarkers and therapeutic targets for prostate cancer. *Frontiers in Bioscience* S2:677-684, DOI:10.2741/93

Patents/Disclosures (5 applications)

Daniel A. Heller and **Ryan M. Williams**. Nucleic Acid-Loaded Mesoscale Nanoparticles. Disclosure of Intellectual Property, Memorial Sloan Kettering Cancer Center D2020-0002. January, 2020.

Daniel A. Heller and **Ryan M. Williams**. SWCNT-DNA-Antibody Conjugates, Related Compositions, and Systems, Methods, and Devices for Their Use. PCT application PCT/US17/26563. International filing April 2017. Priority date May 2016.

Daniel A. Heller and **Ryan M. Williams**. Mesoscale nanoparticles for selective targeting to the kidney and methods of their therapeutic use. PCT application PCT/US2016/022879. International filing March 2016. Priority date March 2015.

Letha J. Sooter and **Ryan M. Williams**. Single-stranded DNA sequences that bind atrazine and simazine. Disclosure of Intellectual Property, West Virginia University Docket No. 00584. Submitted December 2011.

Letha J. Sooter, Kailey Imlay, and **Ryan M. Williams**. Single-stranded DNA sequences that bind to *Pseudomonas aeruginosa* Exotoxin A. Disclosure of Intellectual Property, West Virginia University Docket No. 00585. Submitted December 2011.

Commercial Development

- Founding Advisor, Nirova Biosense, Inc. 2019-Present
A preclinical-stage corporation focused on clinical translation of the implantable sensor device I developed in my postdoctoral work

- Senior Technical Advisor, Goldilocks Therapeutics, Inc. 2018-Present
A preclinical-stage corporation focused on scale-up and clinical translation of the mesoscale nanoparticle platform I developed in my postdoctoral work
- Weill Cornell Medicine Bench to Bedside Entrepreneurship Initiative
 - 1st place team business plan competition 2015
 - 2nd place team business plan competition 2014
- WVU Linking Innovation, Industry, and Commercialization Biomedical Sciences Graduate Student Event Speaker 2012, 2013

Teaching and Laboratory Mentoring Experience

Laboratory Mentoring

As a PI

9 total trainees, CCNY

6 undergraduate students: CCNY BME majors

2 technicians: 1 from Duke University, BS in Neuroscience; 1 from Kenyon College, BA in Chemistry/English

1 Master's student: CCNY BME

As a trainee

36 total students, West Virginia University

21 total students, Memorial Sloan Kettering Cancer Center

39 co-author conference abstracts as laboratory mentor

3 High School Students: 1 at WVU-Morgantown High School; 2 at MSKCC-Bronx Science High School and Hunter College High School

19 Undergraduate Students: 16 at WVU-Departments of Biology, Freshman Engineering, Chemical Engineering, Forensics and Investigative Sciences, NanoSAFE REU Program/WV Wesleyan College Department of Biology; 3 at MSKCC-Summer Undergraduate Research Program-University of Maryland Department of Chemistry, Cornell University Department of Biomedical Engineering, and NYIT Department of Biology

21 Graduate Rotation Students: 11 at WVU-Biomedical Sciences Graduate Program; 10 at MSKCC-Tri-Institutional MD/PhD Program, Tri-Institutional Chemical Biology Program, Weill Cornell Physiology, Biophysics, & Systems Biology Program, MSKCC Graduate School of Biomedical Sciences, and Weill Cornell Pharmacology

5 Graduate Students: 4 at WVU-Departments of Chemistry, Biology, and Pharmaceutical Sciences; 1 at MSKCC-Weill Cornell Pharmacology Program

1 Pharmacy Student: WVU School of Pharmacy

3 Medical Students: MSKCC Summer Fellowship Program-Indiana University, University of Massachusetts, Albert Einstein College of Medicine

1 Medical Fellow: MSKCC-University of Alabama Birmingham Nephrology/Oncology

4 Research Technicians: 3 at WVU; 1 at MSKCC

Teaching

Department of Biomedical Engineering, The City College of New York

BME 310, Experimental Methods

Spring 2020

Lecture and laboratory course focused on engineering and biology lab techniques for upper-level BME students

Graduate Teaching Assistant, Department of Biology, West Virginia University

The Total Science Experience

Spring 2009, 2010

Independent classroom and research instruction in an immersive scientific writing-based capstone course for Biology majors

Vertebrate Microanatomy

Fall 2009

Independent hands-on instruction in vertebrate histopathology and lecture support for students

Introductory Biology Lab

Fall 2008

Independent introductory laboratory instruction for freshman Biology majors

International Conference Presentations (16: 6 oral)

Oral

Williams RM, Lee C, Galassi TV, Harvey JD, Leicher R, Sirenko M, Dorso M, Shah J, Olvera N, Dao F, Levine DA, and Heller DA. Employing exciton bandgap modulation in carbon nanotube-based biosensors. The 9th International Conference on Excited State Processes in Electronic and Bio Nanomaterials. Santa Fe, NM. June 2018. *Travel Award*.

Williams RM, Mercer E, Dorso M, Rangarajan S, Shah J, Jaimes E, and Heller DA. Renal selective mesoscale nanoparticles treat acute kidney injury. Biomedical Engineering Society Annual Meeting. Phoenix, AZ. October 2017.

Williams RM, Lee C, Galassi TV, Harvey JD, Leicher R, Sirenko M, Olvera N, Dao F, Levine DA, and Heller DA. Implantable nanosensor detection of an ovarian cancer biomarker in vivo. Biomedical Engineering Society Annual Meeting. Phoenix, AZ. October 2017.

Williams RM, Lee C, Galassi TV, Sirenko M, Shah J, Harvey JD, Levine DA, and Heller DA. Detection of an ovarian cancer biomarker via an implantable single-walled carbon

nanotube biosensor. Biomedical Engineering Society Annual Meeting. Minneapolis, MN. October 2016.

Williams RM, Lee C, Galassi TV, Shah J, Harvey JD, and Heller DA. Ovarian cancer biomarker detection by single-walled carbon nanotube optical bandgap modulation. World Molecular Imaging Congress. New York, NY. September 2016. *Best Pre-clinical Paper*.

Williams RM, Lee C, Galassi TV, Harvey JD, Sirenko M, Shah J, and Heller DA. Biomarker detection by single-walled carbon nanotube optical bandgap modulation. Electrochemical Society Annual Meeting. San Diego, CA. May 2016.

Poster

Williams RM, Mercer E, Dorso M, Tian H, Shah J, Jaimes EA, and Heller DA. Treatment of acute kidney injury with kidney targeting mesoscale nanoparticles. Controlled Release Society Annual Meeting. New York, NY. July 2018.

Williams RM, Lee C, Galassi TV, Harvey JD, Leicher R, Sirenko M, Olvera N, Dao F, Levine DA, and Heller DA. Implantable nanosensor detection of an ovarian cancer biomarker in vivo. American Association of Pharmaceutical Scientists Annual Meeting. San Diego, CA. November 2017. *Fellow Award*.

Williams RM, Mercer E, Shah J, Jaimes E, and Heller DA. Renal selective mesoscale nanoparticles treat acute kidney injury. American Association of Pharmaceutical Scientists Annual Meeting. San Diego, CA. November 2017.

Williams RM, Shah J, Chen X, Jaimes EA, and Heller DA. Mesoscale nanoparticles selectively and safely target renal proximal tubules. American Society of Nephrology Kidney Week. New Orleans, LA. November 2017.

Williams RM, Lee C, Galassi TV, Harvey JD, Leicher R, Sirenko M, Shah J, Olvera N, Dao F, Levine DA, and Heller DA. Non-invasive ovarian cancer biomarker detection via an optical nanosensor implant. Gordon Research Conference and Gordon Research Seminar on Cancer Nanotechnology. Mount Snow, VT. June 2017.

Williams RM, Lee C, Galassi TV, Shah J, Harvey JD, Levine DA, and Heller DA. In vivo detection of an ovarian cancer biomarker via single-walled carbon nanotube optical bandgap modulation. AACR Engineering and Physical Sciences in Oncology Conference. Boston, MA. June 2016.

Williams RM, Shah J, Ng BD, Fu L, Minton DR, Gudas LJ, Park CY, and Heller DA. Mesoscale nanoparticles selectively target renal cell carcinoma. Gordon Research Conference on Cancer Nanotechnology. Mount Snow, VT. June 2015.

Williams RM, Hajiran CJ, Nayeem S, and Sooter LJ. In vitro selection of molecular recognition elements for molecular targeting of prostate cancer. EORTC-NCI-AACR Symposium on Molecular Targets and Cancer Therapeutics. Dublin, Ireland. November 2012.

Sooter LJ and **Williams RM**. Identification and targeting of prostate cancer cells via molecular recognition elements. AIChE Society for Biological Engineering International Conference on Bioengineering and Nanotechnology. Berkeley, CA. June 2012. *Travel Award*.

Williams RM, Nayeem S, and Sooter LJ. *In vitro* selection of prostate cancer cell-specific molecular recognition elements. American Association of Cancer Researchers Annual Meeting, Chicago, IL. April, 2012.

Invited Talks

Lehman College, CUNY, Department of Chemistry Seminar. Translational nanomaterials for in vivo cancer diagnostics and renal disease therapy. April 2020.

CCNY Grove School of Engineering Research Information Seminar Series. Translational nanomaterials for in vivo cancer diagnostics and renal disease therapy. February 2020.

CUNY Advanced Science Research Center Nano Day. Implantable nanosensor detection of an ovarian cancer biomarker in vivo. September 2019.

CCNY BME Department Seminar. Nanomaterials for in vivo cancer biomarker diagnostics and renal disease therapy. September 2019.

MSKCC Translational Kidney Cancer Symposium. Kidney-targeted mesoscale nanoparticles to investigate and treat clear cell Renal Cell Carcinoma. February 2018.

Weill Cornell Medicine Department of Pharmacology Seminar Series. Renal-selective mesoscale nanoparticles treat acute kidney injury. October 2017.

MSKCC Imaging Sciences Symposium. Nanomaterials for in vivo cancer biomarker diagnostics and renal disease therapy. October 2017.

WVU Linking Innovation, Industry, and Commercialization Biomedical Sciences Graduate Student Event. Identification of antibody fragments specific for prostate cancer cells *via* SELEX. March 2013.

WVU Linking Innovation, Industry, and Commercialization Biomedical Sciences Graduate Student Event. Molecular recognition elements for prostate cancer and pesticides. February 2012.

WVNano Brown Bag Lunch Speaker Series. Molecular recognition elements for prostate cancer cells and atrazine. November 2010.

Awarded Funding

AHA Postdoctoral Fellowship <i>Targeting Acute Kidney Injury with Mesoscale Nanoparticle Therapeutics</i>	2017-2019
OCRF Mentored Investigator Award <i>An Ovarian Cancer Biosensor for Rapid, Non-Invasive Disease Detection</i>	2016-2017
AFPE Pre-Doctoral Fellowship <i>The Selection of a Prostate Cancer Cell-Specific Molecular Recognition Element (MRE) for Targeted Therapy and Disease Detection</i>	2011-2013
WVNano Graduate Fellowship Program (NSF) <i>In Vitro Selection of Molecular Recognition Elements for Specific Pesticides</i>	2011-2013

Service

<i>Protocol Coordinator, Heller Lab IACUC</i>	2013-2019
<i>Protocol Coordinator, Heller Lab Institutional Biosafety Committee (IBC)</i>	2013-2019
<i>Poster Evaluator, Weill Cornell Medicine Graduate Student Research Symposium</i>	2018
<i>Retreat Committee Member, Weill Cornell Medicine Pharmacology Graduate Program</i>	2017
<i>Retreat Moderator, Weill Cornell Medicine Pharmacology Graduate Program</i>	2016, 2017
<i>Treasurer, WVU Biology Graduate Student Association</i>	2009-2010
<i>Associate Sports Editor and Staff Writer, Cavalier Daily Newspaper</i>	2007-2008

Professional Society Memberships

Controlled Release Society (CRS)
Biomedical Engineering Society (BMES)
American Heart Association (AHA)
American Society of Nephrology (ASN)
American Association of Cancer Researchers (AACR)
American Association of Pharmaceutical Scientists (AAPS)

Ad hoc Reviewer

<i>Sensors</i>	2020
<i>Cancers</i>	2019-Present
<i>Analytica Chimica Acta</i>	2017-Present
<i>Drug Development and Industrial Pharmacy</i>	2017

Outreach

MESA Charter High School Outreach (Brooklyn, NY)	January 2016
NSF Workshop—Science: Becoming the Messenger	October 2011

WV Nano NanoDays Volunteer Community Outreach	March 2012
University of Virginia Children's Hospital Pediatric Unit	2007-2008
Over 60 volunteer hours	
Energy Express (AmeriCorps) Mentor, Mercer County, WV	Summers 2005, 2006, 2007
Over 900 volunteer hours with elementary school students	
Martha Jefferson Hospital Emergency Department, Charlottesville, Va.	2006-2007
Over 60 volunteer hours	
University of Virginia Madison House Boosters Program	2005-2006
Over 30 in-classroom volunteer hours with elementary school students	