

THAO (LIZ) NGUYEN, Ph. D.

EDUCATION

Ph. D., Analytical Chemistry, University of Maryland, College Park, MD 2012

Thesis: Fast and controlled drug release with conductive polymer nanotubes.

B.S., Chemistry, Lafayette College, Easton PA 2007

EXPERIENCE

The RAND Corporation, Arlington, VA

2017-Present

Associate Physical Scientist—Engineering and Applied Science Division

- Serve on independent expert panel to validate FEMA Public Assistant Grants for the rebuilding of Puerto Rico after Hurricane Maria
- Lead follow on market survey project on upgrades to ICE HSI Video Evidence Collection and Distribution System
- Co-PI DHS project which looked at technical and operational capability gaps of Technical Officers and established a roadmap to reach future operational capabilities
- Provided technical analysis and project management on AoA for Global Position System (GPS)
- Provided analytic support for Executive Secretary Joint Requirements Council (JRC) Analysis at DHS
 - Led initial efforts in establishing portfolio teams across DHS
 - Represented JRC on multiple Department-wide strategic working groups such as Financial System Modernization, Northern Border Strategy and Implementation Plan, and Southern Border Strategy

Homeland Security Studies and Analysis Institute (HSSAI), Falls Church, VA

2015-2017

Analyst—Operations Research Division

- Analytic support for Executive Secretary Joint Requirements Council (JRC) Analysis at DHS
 - Advise federal senior executives on joint capability gaps and operational needs across a range of missions including border enforcement, domain and situational awareness, and cybersecurity
 - Provide foundational analysis and organizational development for the JRC
 - Lead in standing up the Securing and Law Enforcement and Domain and Situational Awareness Portfolio Teams
 - Lead multi-disciplinary team for JRC Performance Based Program Assessment; delivered executive and component level framework, case study, and robust implantation guide in six weeks.
- DHS focused tasks for Transportation Security Agency (TSA) and Customs and Border Protection (CBP)
 - Performed Independent Verification and Validation (IV&V) on various domains within DHS through direct quantitative and qualitative research and analysis
 - Developed data analytics and quantitative models for strategic mission needs analysis (MNA) framework
 - Preparation and presentation of briefs to clients on projects' progress and deliverables
- Analyst Development Program in Applied Systems Thinking Institute – Consulting group

- Expanded and applied analytical skills with critical competencies towards complex challenges in the national defense
- SME for proposal and grant reviews for Defense Threat Reduction Agency (DTRA)
- Supported client in data collection and logging of tests and exercises across DOD
- Gain knowledge and experience in White Paper Development
- Served as mentor for summer 2015 and 2016 internships

National Institute of Standards and Technology, Gaithersburg MD 2012-2015

PREP Postdoc, Research Associate -- MML, MMSD

Developing metrology separation methods for quasi 1D nanostructures

- Responsible for individual research projects critical for the advancement of nanotechnology in manufacturing and environmental and health safety.
- Develop methodology for the separation and characterization of carbon nanotubes for the Nanomanufacturing Initiative.
- Worked with cell culture to analyze the effectiveness of gold nanoparticles as cancer therapeutics.

U. of Maryland, Dept. of Chemistry and Biochemistry, College Park MD 2007-2012

Research Assistant

- Developed nanoscale drug delivery systems
- Synthesized conductive polymer nanotubes to be used in transdermal drug delivery patch for insulin
- Analyzed *in vivo* delivery of model drugs to confirm fast and controlled release with nude mice.
- Synthesized silica nanotubes embedded with magnetic and gold nanoparticles for target triggered drug delivery via X-ray radiation. X-ray irradiation cause bond cleavage of the drugs within the nanotubes and make gold nanoparticles radioactive for PET imaging.

Korea Advance Institute of Science and Technology, Daejeon, S. Korea June 2011-Aug 2011

Research Assistant

- Functionalized conductive polymer to increase biocompatibility
- Functionalize conductive polymers with biomimic compounds to increase their biocompatibility.
- Worked with Korean students and successfully built cross culture and scientific collaborations.

Bristol Myers Squibb, New Brunswick, NJ Summer 2007

Analytical Chemist Intern

Maximize HPLC Separation

- Developed new separation conditions and methodology to isolate an active pharmaceutical ingredient using HPLC in three months.

PUBLICATIONS

J. Chang, S. Calkins, D. McGarvey, N. Kalfa, **T. Nguyen**, M. Roberts-Lahti, and P. Keller. Strategic Sampling Framework for Surveillance Mission Needs Analysis, Final Report, HSSAI Report No. RP 14-14-03 (31 October 2016). Prepared for CBP OA.

J. Chang, S. Calkins, **T. Nguyen**, C. Beam, M. Roberts-Lahti, and P. Keller. Border Condition Index, Final Report v3.0, (1 September 2016). Prepared for CBP.

P. Hammer, E. Sylwester, T. **Nguyen**, C. Adams, Z. Kallenborn, Z., Testerman, D., Holt, S., and Pabst, C. Independent Verification and Validation of the Risk Trade Space Portfolio Analysis (RTSPA) Process, HSSAI Report No. RP15-24-02, (1 September 2016). Prepared for TSA.

Nguyen, T.M., Hackley, V.A., Pettibone, J., and Gigault, J. In situ monitoring, separation, and characterization of gold nanorod transformation during seed-mediated synthesis. *Anal. Bioanal. Chem.* (2016)

Nguyen, T.M., Liu, J., and Hackley, V.A. Fractionation and Characterization of High Aspect Ratio Gold Nanorods Using Asymmetric-Flow Field Flow Fractionation and Single Particle Inductively Coupled Plasma Mass Spectrometry. *Chromatography.* (2015)

Cho, T.J., MacCuspie, R., **Nguyen, T.M.**, Gigault, J., and Hackley, V.A. Unexpected Changes in Functionality and Surface Coverage for Au Nanoparticle PEI Conjugates: Implications for Stability and Efficacy in Biological Systems. *Langmuir.* (2015)

Gigault, J., **Nguyen, T. M.**, Pettibone, J.M. and Hackley, V.A. Accurate determination of the size distribution for polydisperse, cationic nanomaterials by asymmetric-flow field flow fractionation. *Journal of Nanoparticle Research.* (2014).

Nguyen, T.M., Gigault, J., and Hackley, V. PEGylated gold nanorod separation based on aspect ratio: characterization by asymmetric-flow field flow fractionation with UV-Vis detection. *Anal. Bioanal. Chem.*, 406 (6), 1651-1659, (2014).

Nguyen, T.M., Lee, S., and Lee, S.B. Conductive polymer nanotube patch for fast and controlled ex vivo transdermal drug delivery. *Nanomedicine.* (2014)

Nguyen, T.M., Cho, S., Yoon, D., Zong, K., and Lee, S.B. Electrochemical synthesis and modification of PMProDot nanotubes and their enhanced electrochemical properties. *Chem. Comm.*, 48, 2725-2727 (2012)

Graham, L.M., **Nguyen, T.M.**, and Lee, S.B. Nanodetoxification: emerging role of nanomaterials in drug intoxication treatment. *Nanomedicine.* 6(5), 921-928 (2011)

Lee, S.Y. Kim, S.K., **Nguyen, T.M.**, Chung, J.S., Lee, S.B., Choi, K.Y. Kinetics of styrene polymerization to syndiotactic polystyrene metallocene catalyst on flat surface, silica nanotubes reactors and porous silica particles. *Macromolecules.* 44(6), 1383-1392, (2010)

PRESENTATIONS

“Conductive polymer nanotube patch for fast and control *in vivo* transdermal drug delivery”, ACS 242th National Conference, 2011.

“Controlled electrochemical deposition of PMProDot nanotubes with template synthesis method”, ACS 241st National Conference, 2010.

“Gold embedded silica nanotubes for controlled and triggered release using X-ray radiation”, National Institutes of Health Graduate Research Day, 2009 “Targeted drug delivery and triggered release via X-ray magnetic-gold embedded silica nanotubes”, ACS 238th National Conference, Poster Presentation, 2008.

AWARDS/HONORS

John Platt Award at ANSER 2016

Professional Research Experience Program (PREP) in MML, NIST 2012

EAPSI Fellowship (East Asian and Pacific Summer Institute), National Science Foundation 2011

Goldhaber Travel Award, University of Maryland 2011

GAANN Fellowship (Graduate Assistance in Area of National Needs), Dept. of Education 2009

Bioscience Second Place Poster Award, U. of Maryland College of Chemical and Life Science 2009

Best Poster Award, ACS Division of Colloid & Surface Chemistry 2008

Vice President of Community Development, U. of Maryland Graduate Student Government 2010

- Responsible for finding sponsors and organizing a bi-weekly social for the entire graduate student body while managing a budget of \$20,000 for other social and sport events throughout the entire year.

SKILLS

Proficient in speaking Vietnamese

Data Analysis: R (intermediate), Python (beginner)

Analytical Instruments: Asymmetric Field Flow Fractionation, ICP-MS, transmission electron microscopy (TEM), surface emission microscopy (SEM), IR, UV-Vis, Fluorescence, HPLC, GC-Mass Spec, quartz crystal microbalance (QCM), anodic alumina oxide, electrochemistry, EDS, Autodesk, Sigma/Origin Plotting programs, Microsoft Office, ImageJ