



## **Lynn E. McFadden, Ph.D.**

Health Scientist

### **Summary of Experience**

Dr. Lynn McFadden is a toxicologist specializing in inhalation exposure of aerosols while bringing a unique perspective as a trained chemical engineer. She received her BS in Chemical Engineering from Trine University and her MS in Chemical Engineering from the University of Michigan. While at the University of Michigan, she began focusing on human safety through the development of computational modeling for the failure modes of prismatic lithium-ion batteries. She then joined the Chemical and Life Science Engineering Ph.D. program at Virginia Commonwealth University as a member of Dr. Nastassja Lewinski's lab. Here, she developed her toxicological skills and designed, characterized and prototyped a novel, portable *in vitro* exposure cassette (PIVEC). She was a 2016 recipient of a Fulbright Scholarship to Greece to study nano-ceria additives in diesel exhaust using the PIVEC and an additional exposure system. Dr. McFadden has spent time with a contract research organization, overseeing the regulatory testing of a variety of nicotine containing products for microbial content, mutagenicity, cytotoxicity, and genotoxicity. Throughout this work, she understands the unique complexity of aerosols and inhalation exposure thereof and has garnered her skillset to address these concerns. Dr. McFadden has published over 40 abstracts and peer-reviewed papers on various inhalation toxicology and human health related issues.

### **Education**

Bachelor of Sciences (B.S.), Chemical Engineering, 2012, Trine University

Master of Science (M.S.), Chemical Engineering, 2014, University of Michigan

Doctor of Philosophy (Ph.D.), Chemical and Life Science Engineering, 2018, Virginia Commonwealth University

## **Project Experience**

### **Inhalation Toxicology**

Supervised regulatory testing of nicotine containing products for mutagenicity, cytotoxicity, and genotoxicity. Evaluated *in vitro* responses within project reports.

Experienced in computational fluid dynamic modeling to predict deposition of particulates within the human respiratory tract. Provided comparison of multiple literature models for biological aerosols, including viral, bacterial, and fungal exposures and evaluated results within the context of published results.

Primary developer of a novel, portable *in vitro* exposure system targeted to bridge the gap between occupational exposure of nanoparticulate aerosols and laboratory experiments. Conducted a systematic literature review for methodological considerations of exposure at the air-liquid interface, serving as a basis for the design of the portable *in vitro* exposure cassette (PIVEC). The PIVEC was characterized by using copper nanoparticles to determine deposition profiles and biological endpoints of cytotoxicity and oxidative stress. An electrochemical sensor was developed and integrated into the system to provide real-time measurements of oxidative stress. The PIVEC system was utilized for exposures to diesel exhaust and metallic 3D printing.

### **Other Research**

Provided research support for an interdisciplinary group of students in the development of a subcutaneous glucose sensor. This work included design of the sensor, characterization of the sensor *in vitro*, and preliminary *in vivo* experiments in collaboration with Virginia Commonwealth University's School of Medicine.

Experienced in computational fluid dynamic modeling of prismatic lithium-ion batteries focusing on the electrochemical thermodynamics of the system to predict battery failure. Supported computational efforts with experimental methods, measuring temperature profiles and physical swelling of batteries during charge and discharge cycles.

## **Professional Experience**

### **Health Scientist, Valeo Sciences LLC, Mar 2025 – present**

Evaluate the toxicology, health and safety of chemical, physical, and biological hazards in a range of human exposure settings, including occupational, consumer, environmental, and medical.

### **Technical Director – Toxicology, McKinney Specialty Labs, Jun 2024 – Feb 2025**

Served as the primary Study Director or Study Coordinator for client toxicology testing projects of nicotine containing products, responsible for timelines, client communications, protocols, data integrity, and reporting. Oversaw the toxicology department, including project management and scheduling, employee professional development, and strategic opportunities. Provided technical management for troubleshooting and method development. Determined key performance metrics for the toxicology department and presented to executive leadership.

### **Senior Manager – Toxicology, Enthalpy Analytical (acquired by McKinney Specialty Labs Dec 2023), Aug 2022 – Jun 2024**

Served as a Study Director or Study Coordinator for client toxicology testing projects of nicotine containing products, responsible for timelines, client communications, protocols, data integrity,

and reporting. Oversaw project management and scheduling, quality control, and method development.

#### **Toxicology Group Lead, Enthalpy Analytical, Feb 2021 – Aug 2022**

Served as technical management for bacterial assays of nicotine containing products. Oversaw analysts to ensure compliance with laboratory quality standards and protocols.

#### **Postdoctoral Fellow, Gediminas Mainelis Lab - Rutgers University, May 2019 – Feb 2021**

Gained computational experience in biological aerosol deposition within the human respiratory tract. This work was aimed to bridge the gap between experimental measurements and human health effects.

#### **Team Advisor, Vertically Integrated Projects – Virginia Commonwealth University, Aug 2017 – May 2019**

Provided research support for interdisciplinary undergraduate students developing a subcutaneous glucose sensor.

#### **Graduate Research Assistant, Nastassja Lewinski Lab - Virginia Commonwealth University, Jan 2015 – May 2019**

Developed, prototyped, and characterized a novel, portable in vitro exposure system incorporating real-time electrochemical sensing of oxidative stress. This work aimed to mimic real world exposures to engineered nanoparticles to better understand human health outcomes, particularly during occupational exposure. This work was partially funded through a Fulbright Scholarship to Greece (2016-2017) working with the Centre for Research and Technology Hellas in Thessaloniki, Greece.

#### **Graduate Student Research Assistant, Charles Monroe Lab - University of Michigan, Aug 2012 – Dec 2014**

Gained computational fluid dynamic and experimental experience for prismatic lithium-ion batteries. Provided research support for the development of an electrochemical thermodynamic model to predict battery failure due to thermal runaway or swelling.

### **Certifications**

- GLP Study Director and Principal Investigator Training, Society of Quality Assurance, June 2021

### **Professional Membership and Service**

- American Institute of Chemical Engineers (AIChE)
- Tau Beta Pi

### **Peer-Reviewed Publications**

Secondo, L.E., J.A. Sagona, L. Calderon, Z. Wang, M. Sorensen-Allacci, R. Wener, C.J. Andrews, and G. Mainelis. 2021. Estimating lung deposition of fungal spores using airborne spore concentrations. *Environmental Science & Technology*. 55:3, 1852-1863. DOI: 10.1021/acs.est.0c05540

- Sagona, J.A., L.E. Secondo, and G. Mainelis. 2020. Comparison of two models to estimate deposition of fungi and bacteria in the human respiratory tract. *Atmosphere*. 11:6, 561, DOI: 10.3390/atmos11060561
- Secondo, L.E., V. Avrutin, Ü. Özgür, E. Topsakal, N.A. Lewinski. 2020. Real-time monitoring of cellular oxidative stress during aerosol sampling: a proof of concept study. *Drug and Chemical Toxicology*. 45:2, 767-774. DOI: 10.1080/01480545.2020.1774774
- Hays M., S. Wojcieszak, N. Nusrat, L.E. Secondo, and E. Topsakal. 2020. Glucose-dependent dielectric Cole-Cole models of rat blood plasma from 500 MHz to 40 GHz for millimeter-wave glucose detection. *Microwave and Optical Technology Letters*. 62:9, 2813-2820. DOI: 10.1002/mop.32371
- Secondo, L.E., H.I. Adawi, J. Cuddehe, K. Hopson, A. Schumacher, L. Mendoza, C. Cartin, and N.A. Lewinski. 2020. Comparative analysis of ventilation efficiency on ultrafine particle removal in university MakerSpaces. *Atmospheric Environment*. 224:177321. DOI: 10.1016/j.atmosenv.2020.117321
- Secondo, L.E., N.J. Wygal, and N.A. Lewinski. 2019. A new portable in vitro exposure cassette for aerosol sampling. *Journal of Visualized Experiments*. 22:144. DOI: 10.3791/58916
- Lewinski, N.A., L.E. Secondo, and J.K. Ferri. 2019. Enabling real-time hazard assessment at the workplace. *Process Safety Progress*. 38:3. DOI: 10.1002/prs.12030
- Lewinski, N.A., V. Avrutin, T. Izadi, L.E. Secondo, M.B. Ullah, Ü. Özgür, H. Morkoç, and E. Topsakal. 2018. Influence of ZnO thin film crystallinity on in vitro biocompatibility. *Toxicology Research*. 7:5, 754-759. DOI: 10.1039/c8tx00061a
- Secondo, L.E., N.J. Liu, and N.A. Lewinski. 2016. Methodological considerations when conducting in vitro, air-liquid interface exposures to engineered nanoparticle aerosols. *Critical Reviews in Toxicology*. 47:3, 225-262. DOI: 10.1080/10408444.2016.1223015
- Oh, K. J.B. Siegel, L. Secondo, S. Kim, N.A. Samad, J. Qin, D. Anderson, K. Garikipati, A. Knobloch, B.I. Epureanu, C.W. Monroe, and A. Stefanopoulou. 2014. Rate dependence of swelling in lithium-ion cells. 267, 197-202. DOI: 10.1016/j.jpowsour.2014.05.039

## Published Abstracts

- Scian, M.J., L.E. McFadden, C.M. Sovick, C.D. Damron, E.D. Sill, I. Crooks, D. Breheny, E. Bishop, R. Weil, and W.J. McKinney. 2025. Characterization of the aerosol dose uniformity in the 56-well Vitrocell® 48-2.0 Plus Exposure Module. Poster presentation Q781 at the Society of Toxicology (SOT) Annual Meeting & ToxExpo, Orlando, FL; March 16-20, 2025. Abstract 4922.
- McFadden, L.E. 2023. In vitro characterization of a heated tobacco product collected using a novel method. Oral presentation at the OpenTox Meeting, Virtual; November 6-10, 2023.
- Cheetham, A., S. Plunkett, L.E. McFadden, M.J. Scian, S. Marking, B. Coffa, P. Campbell, and S. Gilliland III. 2023. Chemical, pharmacological, and toxicological assessment of 6-methylnicotine. Poster presentation at the 76<sup>th</sup> Tobacco Science Research Conference, Norfolk, VA; September 24-27, 2023.
- Scian, M.J., E. Press, J. Jones, L. Braia, L. Palmer, J. Carbonelle, K. Lassiter, L.E. McFadden. 2023. Neutral red uptake testing of oral nicotine products after extraction with artificial saliva. Poster presentation at the 76<sup>th</sup> Tobacco Science Research Conference, Norfolk, VA; September 24-27, 2023.
- Scian, M.J., K. Hughes, J. Meekins, A. Bhatnagar, G. Freeman, B. Coffa, L.E. McFadden. 2023. Enumeration of TAMC, yeast, and mold of smokeless tobacco products using artificial saliva.

Poster presentation P3447 at the Society of Toxicology (SOT) Annual Meeting & ToxExpo, Nashville, TN; March 19-23, 2023.

Scian, M.J., M. Smith, E. Press, C. Sovick, P. Kosachevsky, and L.E. McFadden. 2022. Generation and testing of high concentration HTP condensate in the neutral red uptake assay. Poster presentation at the 75<sup>th</sup> Tobacco Science Research Conference, New Orleans, LA; September 11-14, 2022.

Scian, M.J., P. Kosachevsky, M. Smith, L.E. McFadden, C. Sovick, J. Smith, B. Kallam, E. Press, T. Pickell, N. Patel, and A. Kumari. 2021. Development of an alternative rotary-like ENDS collection method for in vitro toxicology testing. Poster presentation at the 74<sup>th</sup> Tobacco Science Research Conference, Boston, MA; August 29-31, 2021.

Baltzopoulou, P., L.E. Secondo, A. Asimakopoulou, D. Deloglou, C. Softas, L. Chasapidi, E. Papaioannou, N.A. Lewinski, and A.G. Konstandopoulos. 2017. Cross evaluating the effects of a cerium-based diesel fuel additive on exhaust toxicity with in vitro air-liquid interface cell exposure systems of different flow patterns. Oral presentation at the ETH Conference on combustion generated nanoparticles, Zurich, Switzerland; June 19-22, 2017.

Secondo, L.E., S. Kim, J.B. Siegel, A. Stefanopoulou, and C.W. Monroe. 2014. Simplifying electrothermal dynamics of 15-Ah prismatic li-ion batteries. Oral presentation at the Electrochemical society & La sociedad Mexicana de electroquímica joint international meeting, Cancun, Mexico; October 5-9, 2014.

Kim, S., L.E. Secondo, C.W. Monroe, J. Siegel, and A. Stefanopoulou. 2013. Key parameters for electrothermal dynamics and control of 15-Ah prismatic li-ion batteries. Oral presentation at the 2013 American Institute of Chemical Engineers (AIChE) Annual Meeting, San Francisco, CA; November 3-8, 2013.

Kim S., L.E. Secondo, A. Stefanopoulou, and C.W. Monroe. 2013. Coupling of dynamic electrical and thermal processes in prismatic batteries. Oral presentation at the 224<sup>th</sup> Electrochemical society meeting, San Francisco, CA; October 27 - November 1, 2013.

## Presentations

Scian M.J. and L.E. McFadden. 2024. Using the neutral red uptake (NRU) assay. Institute for In Vitro Sciences Workshop 9, January 24-26, 2024, Virtual.

Scian, M.J., L.E. McFadden, A. Bhatnagar, G. Freeman, E. Wickersham, P. Morris, C. Sovick, P. Kosachevsky, M. Smith. 2022. Generation and testing of high concentration HTP condensate in the bacterial reverse mutation assay. 75<sup>th</sup> Tobacco Science Research Conference, September 11-14, 2022, New Orleans, LA.

Secondo, L.E., J.A. Sagona, and G. Mainelis. 2020. Estimating deposition of viral, bacterial, and fungal aerosols in the human respiratory tract: a two model comparison. American Association for Aerosol Research 38<sup>th</sup> annual conference, October 5-9, 2020, Virtual.

Eshai, S.I., L.E. Secondo, S. Wojcieszak, M. Hays, N.A. Lewinski, V. Avrutin, and E. Topsakal. 2019. Subcutaneous biocompatible continuous glucose monitoring sensor. 2019 International radio science meeting (URSI 2019), January 9-12, 2019, Boulder, CO.

Hays, M., L.E. Secondo, R. Green, N.A. Lewinski, and E. Topsakal. 2019. Cellular interaction with biocompatible titanium nitrite implantable antenna. 2019 International radio science meeting (URSI 2019), January 9-12, 2019, Boulder, CO.

- Nusrat, N., M. Hays, L.E. Secondo, N.A. Lewinski, and E. Topsakal. 2019. Microwave dielectric characterization of rat plasma over various glucose concentrations. 2019 International radio science meeting (URSI 2019), January 9-12, 2019, Boulder, CO.
- Secondo, L.E. 2018. Inhalation effects of metal-based nanoparticle aerosols as studied by a portable, in vitro exposure cassette. Virginia Commonwealth University (VCU) Chemical and Life Science Engineering Seminar, December 2018, Richmond, VA.
- Secondo, L.E., N.J. Wygal, and N.A. Lewinski, 2018. Design and characterization of a new, portable in vitro exposure cassette with real-time monitoring for aerosol measurements. 2018 AIChE Annual Meeting, October 28 – November 2, 2018, Pittsburgh, PA.
- Hughes, C., N. Kumar, L.E. Secondo, D. Wijesinghe, and N.A. Lewinski. 2018. A preliminary analysis of copper nanoparticle pulmonary cytotoxicity. 2018 AIChE Annual Meeting, October 28 – November 2, 2018, Pittsburgh, PA.
- Hughes, C., L.E. Secondo, D. Wijesinghe, B. McInnes, and N.A. Lewinski. 2018. Use of a relational database to reveal nanomaterial toxicity mechanisms. OpenTox USA 2018, July 11-12, 2018, Raleigh-Durham, NC.
- Secondo, L.E., N.J. Wygal, and N.A. Lewinski. 2018. Design and demonstration of a new portable in vitro exposure cassette for aerosols. VCU Spring Graduate Research Symposium, April 24, 2018, Richmond, VA.
- Secondo, L.E., P. Baltzopoulou, A. Asimakopoulou, D. Deloglou, C. Softas, S. Petrakis, L. Chasapidis, E. Papaioannou, A.G. Konstandopoulos, and N.A. Lewinski. 2017. Evaluation of biological effects using a nano-ceria based diesel fuel additive with in vitro air-liquid interface cell exposure systems of different flow patterns. 2017 AIChE Annual Meeting, October 29 – November 3, 2017, Minneapolis, MN.
- Secondo, L.E. 2017. The challenges and opportunities of undergraduate studies in the US. Fulbright orientation, June 2017, United States Consulate in Thessaloniki, Greece.
- Secondo, L.E. 2016. University in the United States: the big school perspective. Invited seminar, November 2016, Anatolia high school, Thessaloniki, Greece.
- Secondo, L.E. and N.A. Lewinski. 2016. Methodological consideration for in vitro, air-liquid interface (ALI) exposures to engineered nanoparticle aerosols. 8<sup>th</sup> International Nanotoxicology Congress, June 1-4, 2016, Boston, MA.
- Hodson, M., L.E. Secondo, and N.A. Lewinski. 2016. In vitro biological response to diesel exhaust particles in lung cells. VCU undergraduate research symposium, April 20, 2016, Richmond, VA.
- Wang, J., I. Jimenes, L.E. Secondo, and N.A. Lewinski. 2016. Detection acellular oxidative reactivity of engineered nanoparticles with DCFH-DA. VCU undergraduate research symposium, April 20, 2016, Richmond, VA.
- Secondo, L.E., M. Hodson, and N.A. Lewinski. 2016. Biological responses of in vitro, air liquid interface exposures to diesel exhaust aerosols. VCU graduate research symposium, April 18, 2016, Richmond, VA.

Secondo, L.E. and N.A. Lewinski. 2015. Toxicological comparison of in vitro exposure techniques of commercial nano products to lung cells. Quantifying exposure to engineered nanomaterial from manufactured products workshop, July 7-8, 2015, Arlington, VA.

Oh, K., J.B. Sigel, L.E. Secondo, B. Epureanu, C.W. Monroe, and A. Stefanopoulou. 2014. Experimental characterization of the swelling of a rechargeable lithium-ion batter under charging and discharging. Material Research Society Spring Meeting and Exhibit, April 21-25, 2014, San Francisco, CA.