LAURYN E. DEGREEFF, Ph.D.
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Associate Professor

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Lauryn E. DeGreeff earned her PhD in forensic chemistry from Florida International University in Miami, FL, where she is presently an associate professor. Dr. DeGreeff's area of research is volatiles analysis as it relates to vapor detection by canine and instruments. Prior to returning to FIU, Dr. DeGreeff conducted her research as part of the Chemistry Division at the US Naval Research Laboratory in Washington DC. In her research, she takes a chemistry-based approach to studying olfaction for the purpose of informing field vapor sampling practices. Her research focuses on trace vapor sampling, characterization, and generation in support of canine and other field detection approaches. Dr. DeGreeff regularly lectures on the dynamics of odor for the operational community and at national and international scientific conferences. She has also authored a many peer-reviewed manuscripts, holds four pending and completed patents, and is the editor of the book entitled *Canines: The Original Biosensor*, to be released in early 2022.

EXPERIENCE

2021-present Associate Professor - Florida International University, Department of Chemistry and Biochemistry and the International Forensic Research Institute

Research interest: *Volatiles sampling and analysis. Analysis, detection, and generation of vapors and related canine detector science.*

Work duties: *Acts as principal investigator on a variety of research projects, overseeing graduate, undergraduate, post-doctoral researchers. Manage collaborative research within the FIU institution and with other university and government institutions. Serves on dissertation and thesis committees for Ph.D. and master's students in the area of forensic science research. This includes directing*

research paths for said graduate students, as well as writing grant proposals for research and equipment funding. Research encompasses many forms of vapor detection, as well as other analytical techniques, with a focus on detection by canine, and is reported in the form of written reports and manuscripts, as well as regular oral presentations at conferences and educational seminars for the operational community.

2018-2021 Courtesy Research Professor – Florida International University, Department of Chemistry and Biochemistry and the International Forensic Research Institute

Work duties: *Serves on dissertation and thesis committees for Ph.D. and master's students in the area of forensic science research. This includes directing research paths for said graduate students, as well as writing grant proposals for research and equipment funding.*

2014-2021 Research chemist – U.S. Naval Research Laboratory, Chemistry Division

Research interest: *Analysis, detection, and generation of vapors and related canine detector science.*

Work duties*: Act as principal investigator on research projects and oversee supporting personnel and researchers. Design research projects and obtain funding for the study of explosive and explosive-related materials and other contraband, to include, but not limited to, trace vapor analysis and material headspace characterization. Research encompasses many forms of vapor detection, as well as other analytical techniques, with a focus on detection by canine, and is reported in the form of written reports and manuscripts, as well as regular oral presentations at conferences and educational seminars for the operational community.*

2012-2014 Post-doctoral fellow – U.S. Naval Research Laboratory, Chemistry Division

Research interest: *Headspace analysis of low volatility explosives and canine training aids.*

2011-2012 Visiting scientist – Federal Bureau of Investigation, Counterterrorism and Forensic Science Research Unit

Research interest*: Detection and determination of volatiles from human scent and odor by analytical instrumentation and development of canine training aids.*

2006-2010 Graduate research assistant – Florida International University

Research interest: *Development of a dynamic headspace concentration technique for the non-contact sampling of human odor samples and the creation of canine training aids.*

2006/2008 **Teaching assistant – Florida International University**

Work duties: *Instructed students on basic laboratory and safety practices. Administered and graded homework and exams.*

2005-2006 **Undergraduate research assistant – Chapman University**

Research interest: *Reactivity of iron oxyhydroxide nanoparticles to metals.*

2002 **Summer intern – New York City Office of the Chief Medical Examiner**

Work duties: *Worked under Dr. Mark Flomenbaum, Deputy Chief Medical Examiner of New York City. Observed and assisted in autopsies, court proceedings, and other workings of the Office of the Chief Medical Examiner. Organized data and materials for potential research studies.*

EDUCATION

2010 **Florida International University – Ph.D. Chemistry**
Miami, FL
Dissertation title: *Development of a dynamic headspace concentration technique for the non-contact sampling of human odor samples and the creation of canine training aids.*
Advisor: *Dr. Kenneth Furton*

2006 **Chapman University – B.S. Chemistry**
Orange, CA
Thesis title: *The photo-production of acetone from dissolved organic matter in seawater.*

2003 **New York University – B.A. Anthropology, pre-medical**
New York, NY

FUNDING (Principal Investigator)

2021-2023 **($315K) Office of Naval Research**
"Validation of vapor transport models by laboratory simulations and canine testing"
Collaborators - Naval Research Laboratory, Chapman University

2020-2021 **($340K) Bureau of Safety and Environmental Enforcement**
"Canine oil detection – Using odor signatures to improve training detection proficiency on land and water"
Collaborators – Chiron K9, Owens Coastal Consultants

2020 **($170K) U.S. Army Combat Capabilities Development Command**
"Analytical chemistry support for field testing"

2020-2021 **($640K) National Institute of Justice**
"Non-contact detection of fentanyl and other synthetic opioids"
Collaborator – Florida International University

2020-2021 **($240K) U.S. Army Combat Capabilities Development Command**
"Quantitative measurement of vaporous targets emanating from PDMS odor capture-and-release technology held in the Training Aid Delivery Device (TADD)"

2019 **($80K) Office of Secretary of Defense, Domestic Preparedness Support Initiative**
"Training aid delivery devices (TADDs) for homemade explosives for use by law enforcement canine handlers – Determination of the shelf life of TADDs"

2019 **($72K) Office of Secretary of Defense, Domestic Preparedness Support Initiative**
"Mixed odor delivery device (MODD) to enhance canine narcotics and explosive detection training

2019-2021 **($600K) Office of Naval Research – Basic Research**
"Empirical and theoretical determination of canine olfactory detection limits using a quantitative vapor delivery system"
Collaborator – Auburn University

2017 **($10K) U.S. Army Combat Capabilities Development Command**
"Rapid Equipping Force's Military Working Dog Scent Kit – Literature Review"

2016 **($53K) Department of Defense Domestic Preparedness Support Initiative**
"Development of an alternative Mixed Odor Delivery Device (MODD) for canine training"

2015-2018 **($750K) Office of Naval Research – Basic Research**
"Exploring the generalization-discrimination balance in odor detection canines"

2015 **($150K) Jerome and Isabella Karle Distinguished Scholar Fellowship**
"Elucidation and modeling of the dynamic vapor signature of hexamethylene triperoxide diamine"

2013-2015 **($550K) Office of Naval Research**
"Analytical support, characterization and optimization of a canine training aid delivery system"

PROFESSIONAL ACTIVITIES

2021-present **Academy Standards Board (ASB)** - Dogs and Sensors Consensus Body, Affiliate member

2021-present **Organization of Scientific Area Committees (OSAC) for Forensic Science** – Dogs and Sensors Subcommittee, Affiliate member

2020-present **Organization of Scientific Area Committees (OSAC) for Forensic Science** – Ignitable Liquids, Explosives and Gunshot Residue Subcommittee member

2019-present **Joint Services Working Dog Research Steering Committee**

2018-2019 **Subject matter expert** to Lowland Search and Rescue on "Improving location of missing people from vulnerable populations using trained search dog"

2016-present **Training seminars** – Regularly present training seminars supporting military and law enforcement canine handlers

2015-2021 **Mentor** to National Research Council post-doctoral fellows

2015-2021 **Mentor** to summer interns through the Naval Research Laboratory summer internship programs

2017 **Co-organizer** – Department of Defense Canine Detection Research Focus Group, hosted at Naval Research Laboratory

2014-2017 **Developed, patented, and brought to market** canine training device (Mixed Odor Delivery Device)

2008-2010 **Committee chair** – Student selection committee for guest lecturers, Department of Chemistry, Florida International University

2006-2010 **Meeting facilitator** – SWGDOG (Scientific Working Group for Dog and Orthogonal Detection Guidelines) bi-annual meetings

2007-2009 **President –** Chemistry and Biochemistry Graduate Student Organization

2004-2006 **President** – Chapman University Chapter of the Student Affiliates of the American Chemical Society

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HONORS AND AWARDS

2020 American Society of Naval Engineers – 30 Inspirational Women Role Models

2020 Keynote speaker for Schmid College Program Honors and Capstone Conference (Chapman University)

2018 Naval Research Laboratory Technology and Transition Award

2018 Naval Research Laboratory Edison Patent Award

2018 Federal Laboratory Consortium Award for Excellence in Technology Transfer

2015	Jerome and Isabella Karle Distinguished Scholar Fellowship
2013	National Research Council Research Associateship
2009	Member of Delta Epsilon Iota Academic Honor Society
2008	Member of Alpha Epsilon Lambda Academic Honor Society
2006	High Achievement in the Study of Chemistry

PRESS

"Controlling the leash of your career", part of the series "30 Inspirational Women Role Models and STEM Advocates*", American Society of Naval Engineers,* Nov. 2020.

Reactions YouTube by American Chemical Society: "Testing the Best Bomb Detectors," 2021 (https://www.youtube.com/watch?v=TRwqOFHOjac).

"Developing a trace vapor generator for explosives and narcotics," *AZoLifeSciences*, 11 Sept 2020.

"Trace vapor generator for detection of explosives, narcotics," *American Institute of Physics* (Phys.org), 18 Aug 2020.

"Shifting focus from traditional to homemade explosives detection," *K-9 Cop Magazine*, by L. DeGreeff et al. (Part I. Issue 57, August/September 2019; Part II. Issue 58, October/November 2019; Part III. Issue 59, December/January 2020).

Richmond NBC12: "Chemists work to train drug-sniffing dogs for law enforcement purposes," 27 July 2019.

NRL Pipeline: "NRL Scientist Educates Baltimore on Research to Support Fleet, Nation," 19 Oct 2018.

Baltimore WBFF Fox 45 news: Two live segments showcasing Mixed Odor Delivery Device, 5 Oct 2018.

NRL YouTube: "K9 Detection Research," 27 June 2018.

"Introducing Bear, a Seattle Police Dog that Can Sniff Out Porn" *The Stranger*, by Sydney Brownstone, 11 Apr 2018

NRL YouTube: "NRL Chemist Develops Device to Train Canine Units," 6 July 2017.

"New Navy Device Helps Dogs Smell Explosives Better" *Stars and Stripes*, by Scott Wyland, 8 Aug 2017

"Engineer Investigates Odor Detection Canines" *South Potomac Pilot*, by Holly Dodds, 18 Aug 2017

"ONR Helps Train the Future Canine Force" *Office of Naval Research Media Release*, by Warren Duffie, 28 April 2015.

Manuscripts and Ph.D. dissertation submitted as evidence in State of Florida v. Casey Anthony, May-June 2011

PUBLICATIONS

Books

DeGreeff, L.E., Schultz, C. (Eds.). *Canines: The Original Biosensors*, Jenny Stanfor Publishing, *In production* (to be published in 2022). ISBN 9789814968041

Peer-reviewed *(corresponding author)*

DeGreeff, L.E., Peranich, K. "Canine olfactory detection of trained explosive and narcotic odors in mixtures." *Forensic Science International*, Accepted.

Vaughan, S.R., Fulton, A.C., DeGreeff, L.E. "Comparative analysis of vapor profiles of fentalogs and illicit fentanyl." *Analytical and Bioanalytical Chemistry*, Accepted.

DeGreeff, L.E., Peranich, K. "Headspace analysis of ammonium nitrate variants and the effects of differing vapor profiles on canine detection." *Forensic Chemistry*, **2021**, *25*, 100342.

Vaughan, S.R., DeGreeff, L.E., Forte, L., Holness, H.K., Furton, K.G. "Headspace analysis of pharmaceutical-grade fentanyl" *Forensic Chemistry*, **2021**, *24*, 100331.

DeGreeff, L.E., Katilie, C.J., Johnson, R., Vaughan, S.L. "Quantitative vapor delivery for improved canine threshold testing" *Analytical and Bioanalytical Chemistry*, **2020**, *413*, 955-966.

Lazarowski, L., Krichbaum, S., DeGreeff, L.E., Simon, A., Singletary, M., Angle, C., Waggoner, L.P. "Methodological considerations in canine olfactory detection research." *Frontiers Veterinary Science,* **2020**, *7*, 408.

(Editor's pick) Giordano, B.C., DeGreeff, L.E., Malito, M., Hammond, M., Katilie, C., Mullen, M., Collins, G.E., Rose-Pehrsson, S.L. "Trace vapor generator for explosives and narcotics (TV-Gen)." *Reviews of Scientific Instruments,* **2020**, *91(8)*, 085112.

DeGreeff, L.E., Simon, A.G., Macias, M.S., Holness, H.K., Furton, K.G. "Controlled odor mimic permeation systems for olfactory training and field-testing." *Journal of Visualized Experiments*, 28 Jan 2021.

DeGreeff, L.E., Simon, A.G., Peranich, K., Holness, H.K., Frank, K., Furton, K.G. "Generalization and discrimination of molecularly similar odorants in detection canines and the influence of training." *Behavioural Processes*, **2020**, *177*, 104148.

Crespo-Cajigas J.M., Perez-Almodovar, L., DeGreeff, L.E. "Headspace analysis of potassium chlorate using on-fiber SPME derivatization coupled with GC/MS." *Talanta*, **2019**, *205*, 120127.

Simon, A.G., DeGreeff, L.E., Frank, K., Peranich, K., Holness, H.K., Furton K.G. "A method for controlled odor delivery in canine olfactory testing." *Chemical Sensing*, **2019**, *44(6)*, 399-408.

Simon, A.G., DeGreeff, L.E. "Variation in the headspace of bulk hexamethylene triperoxide diamine (HMTD): Part II. Analysis of non-detonable canine training aids. *Forensic Chemistry*, **2019**, *13*, 100155.

DeGreeff, L.E., Liddell, H.P.H., Pogue, W.R., Merrill, M.H., Johnson, K.J. "Effect of re-use of surface sampling traps on surface structure and collection efficiency for trace explosive residues." *Forensic Science International,* **2019**, *297*, 254-264.

Katilie, C.J., Simon, A.G., DeGreeff, L.E. "Quantitative analysis of vaporous ammonia by online derivatization with gas chromatography – mass spectrometry with applications to ammonium nitrate-based explosives." *Talanta*, **2019**, *193*, 87-92.

DeGreeff, L.E., Katilie, C.J., Malito, M., Giordano, B. "Mixed vapor generation device for delivery of homemade explosives vapor plumes." *Analytica Chimica Acta*, **2018**, *1040*, 41-48.

DeGreeff, L.E., Cerreta, M., Katilie, C.J. "Variation in the headspace of bulk hexamethylene triperoxide diamine (HMTD) with time, environment, and formulation." *Forensic Chemistry*, **2017**, *4*, 41-50.

DeGreeff, L.E., Malito, M., Katilie, C.J., Brandon, A., Conroy, M.W., Peranich, K., Anath, R., Rose-Pehrsson, S.L. "Passive delivery of mixed explosives vapor from separated components." *Forensic Chemistry*, **2017**, *4*, 19-31.

DeGreeff, L.E., Cerreta, M., Rispoli, M. "Feasibility of canine detection of mass storage devices: A study of volatile organic compounds emanating from electronic devices using solid phase microextraction." *Journal of Forensic Science*, **2017**, *62*(6), 1613-1616.

Steinkamp, F.L., DeGreeff, L.E., Collins, G., Rose-Pehrsson, S.L. "Factors affecting the intramolecular decomposition of hexamethylene triperoxide diamine and implications for detection." *Journal of Chromatography A*, **2016**, *1451*, 55-60.

DeGreeff, L.E., Rogers, D., Katilie, C.J., Johnson, K.J., Rose-Pehrsson, S. "Technical Note: Headspace analysis of explosive compounds using a novel sampling chamber." *Forensic Science International,* **2014**, *248*, 55-60.

DeGreeff, L.E., Weakley-Jones, B., Furton, K.G. "Creation of canine training aids for human remains detection canines utilizing a non-contact, dynamic airflow, volatile concentration technique." *Forensic Science International*, **2012,** *209*, 133-142.

DeGreeff, L.E., Furton, K.G. "Collection and identification of human remains volatiles by non-contact, dynamic airflow sampling and SPME-GC/MS using various sorbent materials." *Analytical and Bioanalytical Chemistry*, **2011**; *401* (4), 1295-1307.

DeGreeff, L.E., Curran, A.M., Furton, K.G. "Evaluation of selected sorbent materials for the collection of volatile organic compounds related to human scent using non-contact sampling mode." *Forensic Science International*, **2011**, *209*,133-142.

Book chapters

Frank, K., DeGreeff, L.E., Furton, K.G. "Explosives detection by dogs." *In Counterterrorist Detection Techniques of Explosives – 2nd Edition*, Elsevier, *In press.*

DeGreeff, L.E. "Introduction – Canines: The Original Biosensors." *In Canines: The Original Biosensors*, Jenny Stanford Publishing, *In press.*

DeGreeff, L.E., Singletary, M., Lazarowski, L. "Sensitivity and selectivity in canine detectors." *In Canines: The Original Biosensors*, Jenny Stanford Publishing, *In press.*

DeGreeff, L.E., Maughan, M. "Understanding the dynamics of odor to aid in odor detection." *In Canines: The Original Biosensors*, Jenny Stanford Publishing, *In press.*

Official Reports

DeGreeff, L.E., Katilie, C.J., Simon, A.G. "Evaluation and characterization of novel canine training aid devices to enhance narcotics and homemade explosive detection" *Memorandum report (NRL/MR/6181—19)*.

DeGreeff, L.E., Simon, A.G., Peranich, K., Frank, K., Holness, H.K., Furton, K.G. "Canine discrimination of trained odors from simple and complex mixtures" *Memorandum Report (NRL/MR/6181—19-9923),* **20 Aug. 2019**.

Rose-Pehrsson, S.L., Collins, G.E., Hammond, M., Giordano, B., DeGreeff, L.E., "Trace vapor generator for explosives and narcotics (TV-Gen)" *Memorandum Report (NRL/MR6181—18-9829)*, **8 Dec. 2018**.

Peranich, K., DeGreeff, LE. "Canine Research – Past, present, future: Analysis of gaps and user needs." *Naval Surface Warfare Center, Indian Head Explosive Ordnance Disposal Technology Division Final Report (IHTR 3775)*, **28 Nov. 2018.**

Simon, A.G., DeGreeff, L.E., Maughan, M., Gadberry, J. "Canine detection of explosives: Shifting focus from traditional to homemade explosives." *Memorandum Report (NRL/MR/6181—18-9794),* **17 Sept. 2018.**

Simon, A.G., DeGreeff, L.E., Peranich, K., Holness, H., Furton, K.G. "Canine generalization to molecularly similar odors and odor mixtures." *Memorandum Report (NRL/MR/6181—18-9797),* **22 June 2018.**

DeGreeff, L.E., Peranich, K., Simon, A.G. "Detection of ammonium nitrate variants by canine: A study of generalization between like substances." *Memorandum Report (NRL/MR/6181—18-9791),* **30 April 2018.**

DeGreeff, L.E., Conroy, M. W., Malito, M, Harrison, C. "Development of an alternative mixed odor delivery device (MODD) for canine training." *Memorandum Report (NRL/MR/6180—17-9732)*, **10 May 2017**.

DeGreeff, L.E., Katilie, C.J. Malito, M., Brandon, A., Ananth, R., Rose-Pehrsson, S.L., "Analytical Support, Characterization, and Optimization of a Canine Training Aid Delivery System: Phase 2," *Memorandum Report (NRL/MR/6180—16-9657)*, **29 January 2016**.

DeGreeff, L.E., Katilie, C.J., Johnson, K.J., Rose-Pehrsson, S. "Headspace analysis of hexamethylene triperoxide diamine (HMTD)." *Memorandum Report (NRL/MR/6180—15-9605)*, **April 7, 2015**.

DeGreeff, L.E., Katilie, C.J., Malito, M., Brandon, A., Ananth, R., Rose-Pehrsson, S.L. "Analytical Support, Characterization, and Optimization of a Canine Training Aid Delivery System: Phase 1." *Memorandum Report (NRL/MR/6180—15-9603)*, **February 18, 2015**.

PATENTS

DeGreeff, L.E., Crespo-Cajigas, J.M., Katilie, C.J. "Indicating cross-contamination of volatile organic compounds between closed containers stored in proximity using a colorimetric sensor." Invention disclosure (Navy Case No. 114303), **27 Jan 2021**.

DeGreeff, L.E., Crespo-Cajigas, J.M. "Derivatization of vaporous chlorine by propylene oxide." Patent application (Navy Case No. 109358-US1), **04 Feb 2020**.

DeGreeff, L.E., Katilie, C.J. "Online chemical derivatization using a cooled programmed temperature vaporization inlet." US Patent No. US10648955B2, **12 May 2020**.

DeGreeff, L.E., Malito, M., Brandon, A., Katilie, C.J. "Mixed Odor Delivery Device (MODD)," U.S. Patent No. US9986720B2, **05 June 2018**.

PRESENTATIONS AND SEMINARS (<u>presenter</u>)

Invited – Scientific conferences

DeGreeff, L.E. "Understanding odor for better canine detection," Detection Dog Panel, 10th Annual Forensic Science Symposium (virtual); 07 Jun 2021.

DeGreeff, L.E., Katilie, C.J., Giordano, B. "Applications of dynamic and static headspace extraction methods with GC/MS to characterize and quantify vapor from canine training materials," Consensus Analytical Methods for K9 Training Aid Verification (virtual); 08 Mar 2021.

DeGreeff, L.E., Vaughan, S., Forte, L., Holness, H.K., Furton, K.G. "Non-contact detection of fentanyl and other synthetic opioids," 4th Annual National Institute of Justice Forensic Science Symposium at Pittcon 2021 (virtual); 11 Mar 2021.

Keynote: DeGreeff, L.E., Furton, K.G. "Discovering the invisible: The future of forensic detection including identification through human scent traces," GCC Forensics Conference and Exhibition; Manama, Bahrain; 14 Nov 2019.

DeGreeff, L.E. "Canine detectors: The original biosensor," Gordon Research Conference; Newport, RI; 26 June 2018.

Scientific conferences

Fulton, A., Vaughan, S., DeGreeff, L., "Headspace analysis of street-grade fentanyl and the development of a non-contact detection method for fentanyl," 10th Annual Forensic Science Symposium (virtual); 10 Jun 2021.

DeGreeff, L., "Analytical support for canine odor detection at the U.S. Naval Research Laboratory," Working Dog Research Forum (virtual); 30 Mar 2021.

Maughan, M., Gadberry, J., DeGreeff, L., "Person-borne improvised explosive device (PBIED) detection evaluation," Working Dog Research Forum (virtual); 30 Mar 2021.

DeGreeff, L., Vaughan, S., Forte, L., Holness, H.K., Furton, K.G. "Characterization of the vapor profile of fentanyl and related analogs for instrumental and canine detection" NIJ Forensic Science Research and Development Symposium (virtual); 16 Feb 2021.

DeGreeff, L., Katilie, C.J., Johnson, R. "A method for the determination of canine olfactory limits of detection using a quantitative vapor delivery system," American Academy of Forensic Sciences (virtual); 15-19 Feb 2021.

DeGreeff, L., Vaughan, S., Forte, L., Holness, H.K., Furton, K.G. "Determination of the headspace profiles of fentanyl and related analogs for instrumental and canine detection" American Academy of Forensic Sciences (virtual); 15-19 Feb 2021.

Forte, L., Vaughan, S., DeGreeff, L.E., Holness, H., Furton, K.G. "The effects of degradative stress on vapor analysis of fentanyl," American Academy of Forensic Sciences (virtual); 15-19 Feb 2021.

Crespo Cajigas, J.M., Katilie, C., DeGreeff, L., Kabir, A., Furton, K.G. "Towards a vapo-chromic colorimetric sensor for the cross-contamination of volatile organic compounds (VOCs)," American Academy of Forensic Sciences (virtual); 15-19 Feb 2021.

Katilie, C.J., DeGreeff, L.E. "Quantitative headspace analysis of canine training aid delivery devices for the detection of potassium chlorate, ammonium nitrate, and urea nitrate," Pittsburgh Conference and Exposition; Chicago, IL; 3 March 2020.

Mullen, M., Katilie, C.J., Giordano, B.C., DeGreeff, L.E., Collins, G., Rose-Pehrsson, S.L. "Understanding the dynamics of explosive vapor transport," Pittsburgh Conference and Exposition; Chicago, IL; 3 March 2020.

DeGreeff, L.E., Katilie, C.J. "A method for the determination of canine olfaction detection limits using a quantitative vapor delivery system," Pittsburgh Conference and Exposition; Chicago, IL; 3 March 2020.

Rose-Pehrsson, S.L., Collins, G.E., Giordano, B.C., Malito, M.P., Hammond, M.H., DeGreeff, L.E., Katilie, C.J., Cerreta, M.C., Simon, A.G., "Trace vapor testbed and vapor generators for hazardous chemicals, explosives, and narcotics," Pittsburg Conference and Exposition; Philadelphia, PA; 18 Mar 2019.

Rose-Pehrsson, S.L., Collins, G.E., Malito, M.P., Hammond, M.H., DeGreeff, L.E., Katilie, C.J., Cerreta, M.C., Simon, A.G. "Trace vapor generator for explosives and narcotics (TV-Gen): An overview," American Academy of Forensic Sciences; Baltimore, MD; 18-23 Feb 2019.

Simon, A.G., DeGreeff, L.E. "Analysis of non-detonable canine training aids for hexamethylene triperoxide diamine (HMTD)," American Academy of Forensic Sciences; Baltimore, MD; 18-23 Feb 2019.

DeGreeff, L.E., Peranich, K., Simon, A.G. "Current state of homemade explosives detection by canines: Research and knowledge gaps." American Academy of Forensic Sciences; Baltimore, MD; 18-23 Feb 2019.

DeGreeff, L.E., Katilie, C.J., Rose-Pehrsson, S.L., Malito, M.P. "A novel odor delivery device for homemade explosive analysis." American Academy of Forensic Sciences; Baltimore, MD; 18-23 Feb 2019.

DeGreeff, L.E.; Peranich, K.P.; Simon, A.G. "Current state of HME detection by canines: research and knowledge gaps," Trace Explosives Detection Workshop; Ottawa, ON, Canada; 10-13 April 2018.

Simon, A.G.; Peranich, K.P.; DeGreeff, L.E. "Detection of ammonium nitrate variants by canines: a study of generalization between like substances," Trace Explosives Detection Workshop; Ottawa, ON, Canada; 10-13 April 2018.

Peranich, K.P., DeGreeff, L.E.; Simon, A.; Holness, H. "Exploring the generalization-discrimination balance in odor detection canines," 1st International Canine Science Conference; Tempe, AZ; 8 October 2017.

Rose-Pehrsson, S.L., Collins, G.E., Hammond, M.H., Giordano, B.C., DeGreeff, L.E., Tamanaha, C. "Trace explosive vapor generation methods," 12th International Symposium on the Analysis and Detection of Explosives; Oxford, UK; 17-21 Sept 2017.

DeGreeff, L.E., Rose-Pehrsson, S.L., Malito, M. "A novel delivery device for homemade explosive analysis," ISOCS/IEEE International Symposium on Olfaction and Electronic Nose; Montreal, Quebec, Canada; 28-31 May 2017.

DeGreeff, L.E. "Considerations in the vapor analysis of traditional vs. homemade explosives," ISOCS/IEEE International Symposium on Olfaction and Electronic Nose; Montreal, Quebec, Canada; 28-31 May 2017.

DeGreeff, L.E., Katilie, C.J., Malito, M., Rose-Pehrsson, S.L. "Evaluation of a novel vapor delivery device for homemade explosives analysis," 9th Annual Workshop on Trace Explosives Detection; Santa Fe, NM; 24-28 April 2017.

Katilie, C.J., DeGreeff, L.E., Giordano, B., Collins, G., Rose-Pehrsson, S.L. "Generation and evaluation of airborne explosive particles," 9th Annual Workshop on Trace Explosives Detection; Santa Fe, NM; 24-28 April 2017.

DeGreeff, L.E., Rose-Pehrsson, S.L., Katilie, C.J., Malito, M. "Evaluation of a novel vapor delivery device for homemade explosive analysis," Pittsburgh Conference and Exposition, Chicago, IL, 5-9 March 2017.

Katilie, C.J., DeGreeff, L.E., Lubrano, A., Andrews, B., Rose-Pehrsoon, S.L. "Trace ammonia vapor analysis by GC/MS for the detection of ammonium nitrate explosives," Pittsburgh Conference and Exposition, Chicago, IL, 5-9 March 2017.

Katilie, C.J., DeGreeff, L.E., Rose-Pehrsson, S.L. "Headspace Analysis of Binary Explosive Mixtures Using the Mixed Odor Delivery Device," Trace Explosives Detection Workshop, Charlottesville, VA, 4-8 April 2016.

DeGreeff, L.E., Katilie, C.J., Steinkamp, F.L. "HMTD Decomposition," Trace Explosives Detection Workshop, Charlottesville, VA, 4-8 April 2016.

DeGreeff, L.E., Katilie, C.J., Steinkamp, F.L. Rose-Pehrsson, S.L., "Analysis of the Decomposition of Hexamethylene Triperoxide Diamine (HMTD) as Determined by SPME-GC/MS and LC/MS," Pittsburgh Conference and Exposition, Atlanta, GA, 6-10 March 2016.

DeGreeff, L.E., Katilie, C.J., Steinkamp, F.L., Rose-Pehrsson, S.L. "Vapor analysis of binary explosive mixtures." Presented at the Trace Explosive Detection Workshop, Pittsburgh, PA, April 2015.

DeGreeff, L.E., Katilie, C.J., Steinkamp, F.L., Rose-Pehrsson, S.L. "Vapor analysis of binary explosive mixtures." Presented at the Pittsburgh Conference and Exposition, New Orleans, LA; March 2015.

Katilie, C.J., DeGreeff, L.E., Johnson, K.J., Rose-Pehrsson, S.L. "Headspace analysis of dinitrotoluene isomers." Presented at the Pittsburgh Conference and Exposition, New Orleans, LA; March 2015.

DeGreeff, L.E., Katilie, C.J., Malito, M., Brandon, A., Ananth, R., Rose-Pehrsson, S. "Instrumental and biological detection of ammonium nitrate-based explosives." Presented at the Trace Explosive Detection Workshop, Charlottesville, VA; April 2014.

Steinkamp, F.L., Giordano, B., DeGreeff, L.E., Collins, G., Rose-Pehrsson, S. "Ammonium nitrate vapor generation." Presented at the Trace Explosives Detection Workshop, Charlottesville, VA; April 2014.

DeGreeff, L.E., Katilie, C.J., Johnson, K.J., Rose-Pehrsson, S. "Headspace analysis of low volatility explosive compounds." Presented at the Pittsburgh Conference and Exposition, Chicago, IL; March 2014.

DeGreeff, L.E., Katilie, C.J., Newsome, G.A., Johnson, K.J., Rose-Pehrsson, S. "Headspace analysis of low volatility explosive compounds." Presented at the International Symposium on Analysis and Detection of Explosives, The Hague, Netherlands; October 2013.

Newsome, G.A., DeGreeff, L.E., Johnson, K.J., Rose-Pehrsson, S. "Detection of explosive molecular adduct ions with flowing atmospheric pressure afterglow mass spectrometry." Presented at the 61st Meeting of the American Society for Mass Spectrometry, Minneapolis, MN; June 2013.

DeGreeff, L.E., Tipple, C.A., Grime, M.A., Stockham, R.A., Eckenrode, B.A. "Comparison of extraction and analysis techniques for the collection and determination of the volatile organic compounds (VOCs) from dried blood." Presented at the Pittsburgh Conference and Exposition, Philadelphia, PA; March 2013.

DeGreeff, L.E., Snyder, D.L., Tipple, C.A., Grime, M.A., Stockham, R.A., Eckenrode, B.A. "Use of canines to detect dried human blood and instrumental methods for the determination of odor profiles." Presented at the 65th American Academy of Forensic Sciences, Washington, DC; February 2013.

DeGreeff, L.E., Caldwell, P.T., Snyder, D., Tipple, C.A., Stockham, R., Eckenrode, B. "Forensic analysis of volatile and microbial contributors to human scent via multiple extraction methods." Presented at the Pittsburgh Conference and Exposition, Orlando, FL; March 2012.

DeGreeff, L.E., Snyder, D., Caldwell, P.T., Tipple, C.A., Grime, M., Stockham, R., Rushing, B., Eckenrode, B. "Detection and identification of volatile organic compounds in dried human blood samples by instrumental analysis and canines." Presented at the 64th American Academy of Forensic Science Conference, Atlanta, GA; February 2012.

Eckenrode, B., Tipple, C.A., Caldwell, P.T., DeGreeff, L.E., Dulgerian, N., Stockham, R. "GCxGC-MS mapping of human volatiles." Presented at the 59th Meeting of the American Society of Mass Spectrometry, Seattle, WA; June 2011.

Furton, K.G., Caraballo, N.I., DeGreeff, L.E., Brown, J.S. "Advances in the field of laboratory detection of human remains." Presented at the Pittsburgh Conference and Exposition, Orlando, FL; March 2012.

DeGreeff, L.E., Furton, K.G. "Collection and determination of human remains volatiles by non-contact, dynamic airflow." Presented at the Florida Annual Meeting and Exposition, American Chemical Society Regional Conference, Tampa, FL; May 2010.

DeGreeff, L.E., Furton, K.G. "Determination of the odor signature of human remains using non-contact, dynamic airflow sampling." Presented at the Pittsburgh Conference and Exposition, Orlando, FL; March 2010.

DeGreeff, L.E., Furton, K.G. "Collection of human remains volatiles by non-contact, dynamic airflow sampling." Presented at the 62nd American Academy of Forensic Science Conference, Seattle, WA; February 2010.

DeGreeff, L.E., Curran, A.M., and Furton, K.G. "Optimization of the Scent Transfer Unit (STU-100) for the non-contact sampling of human scent volatile compounds." Presented at the 61st American Academy of Forensic Science Conference, Denver, CO; Feb. 2009.

DeGreeff, L.E., Herran, S., and Furton, K.G. "The development of the human scent collection chamber for the minimization of environmental contamination during non-contact human scent sampling." Presented at the 60th American Academy of Forensic Science Conference, Washington DC; Feb. 2008.

Furton, K.G., Aarons, J., DeGreeff, L.E., Holness, H., Hudson, D.T., Macias, M., Prada, P.A. "The chemistry and law behind the use of canines and machines to identify drug money and suspects." Presented the 83rd American Chemistry Society Florida Annual Meeting and Exposition, Orlando, FL; May 2007.

McKee, M.A., DeGreeff, L.E., Kim, C.S. "Reactivity of iron oxyhydroxide nanoparticles with As(V), Cu(II), Hg(II), and Zn(II) as a function of particle size." Presented at the 231st American Chemical Society National Conference, Atlanta, GA; March 2006.

Kim, C.S., DeGreeff, L.E., Lentini, C.J. "Synchrotron-based studies of metal adsorption and (co)-precipitation with iron oxyhydroxide nanoparticles." Presented at the 231st American Chemical Society National Conference, Atlanta, GA; March 2006.

DeGreeff, L.E., DeBruyn, W.J. "The photo-production of acetone from dissolved organic matter in seawater." Presented at the American Chemical Society Western Regional Conference, Anaheim, CA; January 2006.

DeGreeff, L.E., Kim, C.S. "The effect of particle size on copper uptake to iron oxyhydroxide nanoparticles as a function of pH." Presented at the American Chemical Society Western Regional Conference, Anaheim, CA; January 2006.

Kim, C.S., DeGreeff, L.E., Lentini, C.J., McKee, M.A., Waychunas, G.A. "Spectroscopic and macroscopic studies of heavy metal interactions with iron oxyhydroxide nanoparticles." Presented at the NSF-sponsored Nanoscale Processes in the Earth and Planetary Sciences workshop, Albuquerque, NM; January 2006.

Invited – Seminars

DeGreeff, L. E. "Odor chemistry basics for explosives detection canine handlers," presented to the Central Intelligence Agency K9 team; Dulles, VA; 1 June 2021.

DeGreeff, L.E., Bunker, P. "Training aid storage and handling," Fundacja IRMA - Webinar; 11 May 2021.

DeGreeff, L.E., "A chemist's perspective on the canine detection of explosives with considerations related to homemade explosives (HME's)," presented at the 30th Annual California Narcotics Canine Association Training Institute (virtual); 3 May 2021.

DeGreeff, L.E., "Odor chemistry basics for canine handlers," presented at the 30th Annual California Narcotics Canine Association Training Institute (virtual); 3 May 2021.

DeGreeff, L.E., "Odor analysis of human remains," presented to the Human Remains Detection Canine Training Forum (virtual); 28 Jan 2021.

DeGreeff, L.E., Peranich, K., Simon, A.G. "Odor basics for the Nosework dog handler," Fundacja IRMA - Webinar; 13 Sept 2020.

DeGreeff, L.E. "K9s Detection of Explosives and HMEs," Fundacja IRMA - Webinar; 31 May 2020.

DeGreeff, L.E. "You stink! Human scent – living and dead – for K9 teams," Fundacja IRMA - Webinar; 14 May 2020.

DeGreeff, L.E. "Odor chemistry basics for K9 handlers," Fundacja IRMA - Webinar; 10 May 2020.

DeGreeff, L.E., Maughan, M., Gadberry, J. "The science of odor and odor detection," Military Working Dog Leadership Conference; San Antonio; 29-31 Jan 2020.

DeGreeff, L.E. "Odor basics for detection and training," K9 Sport Scent Work Conference; Palm Springs, CA; 17 Jan 2020.

DeGreeff, L.E. "Explosive Chemistry and Odor," Canadian Police Canine Association Explosive Detection Dog Trainers Course; Toronto, CAN; 15 Jan 2020.

DeGreeff, L.E., Simon, A.G., Peranich, K. "Canine generalization / discrimination balance," National Association of Canine Scent Works – Webinar; 28 Aug 2019.

DeGreeff, L.E., "Considerations in the detection of homemade explosives," Handler Instruction and Training Seminar; Chicago, IL; 15 Aug 2019.

DeGreeff, L.E., "The chemistry of odor and odor detection," Handler Instruction and Training Seminar; Chicago, IL; 15 Aug 2019.

DeGreeff, L.E., "The chemistry of odor and odor detection," 2019 Blueline K9 Training Conference and Vendor Show; Pittsburgh, PA; 25 Apr 2019.

DeGreeff, L.E., Simon, A.G., Peranich, K. "Odor basics for detection and training," National Association of Canine Scent Works – Webinar; 11 Apr 2019.

DeGreeff, L.E., Simon, A.G., and Peranich, K. "Odor basics for detection and training," California Narcotics Canine Association and National Association of Canine Scent Work Joint Training Seminar; Palm Springs, CA; 31 Jan 2019.

DeGreeff, L.E. "Considerations in the detection of homemade explosives," 28th Annual California Narcotics Canine Association Law Enforcement Training Institute; Palm Springs, CA, 28 and 29 Jan 2019.

DeGreeff, L.E. "The chemistry of odor and odor detection – Explosives detection" invited seminar for Transportation Security Administration; San Antonio, TX; 26 Nov 2018.

DeGreeff, L.E. "The chemistry of odor and odor detection – Narcotics and human detection" invited seminar for Customs and Border Patrol; Tucson, AZ; 16 Nov 2018.

DeGreeff, L.E. "Canine detectors: The original biosensor," invited seminar at Wayne State University Chemistry Department; Detroit, MI; 16 Oct 2018.

DeGreeff, L.E. "Headspace analysis and quantitation of problematic volatile species by SPME and other methods," invited seminar at Smithsonian Museum Conservation Institute; Suitland, MD; 6 Sept 2018.

DeGreeff, L.E. "Traditional vs. homemade explosives," Handler Instruction and Training Seminar (HITS); Washington, DC; 17 Aug 2018.

DeGreeff, L.E. "The chemistry of odor and odor detection," Handler Instruction and Training Seminar (HITS); Washington, DC; 17 Aug 2018.

DeGreeff, L.E. "Detection of human remains by canine," Canadian Police Canine Association Handler Development Seminar; Barrie, ON, Canada; 19-22 June 2018.

DeGreeff, L.E. "Detection of homemade explosives by canine," Canadian Police Canine Association Handler Development Seminar; Barrie, ON, Canada; 19-22 June 2018.

DeGreeff, L.E., Peranich, K. "The chemistry of odor and odor detection," 2017 United States Marine Corp Military Working Dog Kennel Master's Conference; San Antonio, TX; 24-28 July 2017.

DeGreeff, L.E. "Man's best friend does science: The chemistry behind canine detection," NRL Academy Lecture Series; Washington DC; 14 June 2017.

Other presentations

Rose-Pehrsson, S.L., Collins, G.E., Giordano, B.C., Malito, M.P., Hammond, M.H., DeGreeff, L.E., Katilie, C.J., Simon, A.G., "Trace vapor testbed and vapor generators for hazardous chemicals, explosives, and narcotics," Vapor Methods Standard Working Group; Washington, DC; 2 May 2019.

DeGreeff, L.E. "The chemistry of odor: How understanding odor can foster a better detector," International Working Dog Conference; Stockholm, Sweden; 1-5 Sept 2019.

Frank, K., Simon, A.G., Peranich, K., Holness, H., Furton, K.G., DeGreeff, L.E. "A method for controlled odor delivery in canine olfactory testing," International Working Dog Conference; Stockholm, Sweden; 1-5 Sept 2019.

DeGreeff, L.E., Simon, A.G., Katilie, C.J., Malito, M. "Training tools to aid in the detection of homemade explosives," International Working Dog Conference; Stockholm, Sweden; 1-5 Sept 2019.

Simon, A.G.; Peranich, K.P.; DeGreeff, L.E. "Exploring the effects of the generalization-discrimination balance and availability in odor detection canines," Naval Research Laboratory Sigma Xi Post-Doctoral Poster Session; Washington, D.C.; 13 December 2017.

DeGreeff, L.E.; Peranich, K.P.; Simon, A.; Holness, H. "Exploring the generalization-discrimination balance in odor detection canines," Navy Knowledge Counter-IED Network; Dahlgren, VA; 19 October 2017.

Simon, A., DeGreeff, L.E., Peranich, K. "Evaluation of the generalization-discrimination balance for detection canines," International Defence and Security Canine Conference; Cirencester, UK, 11-13 July 2017.

DeGreeff, L.E., Peranich, K. "The chemistry of odor and odor detection," International Defence and Security Canine Conference; Cirencester, UK, 11-13 July 2017.

DeGreeff, L.E., Malito, M., Katilie, C.K., Peranich, K. "Odor delivery for canine training on binary explosives," International Working Dog Conference; Banff, Alberta, Canada; 5 April 2017.

DeGreeff, L.E., Peranich, K. "The chemistry of odor and odor detection," International Working Dog Conference; Banff, Alberta, Canada; 5 April 2017.

DeGreeff, L.E., Peranich, K. "Exploring the generalization-discrimination balance in odor detection canines," International Working Dog Conference; Banff, Alberta, Canada; 5 April 2017.

Rose-Pehrsson, S.L., DeGreeff, L.E., Giordano, B., Collins, G., Steinkamp, F.L., Lubrano, A., Andrews, B., Newsome, G.A. "Ammonium Nitrate (AN) Detection with Mass Spectrometry," ALERT ADSA Workshop, Boston, MA, 10-11 May 2016.

DeGreeff, L.E. "The Chemistry of Odor Detection: Application to Canine Training," Canadian Security and Safety Program Briefing on the Scientific Efficacy and Development of Canine Explosive Training Aids, Ottawa, Canada, 10 February 2016.

DeGreeff, L.E., Katilie, C.J., Rose-Pehrsson, S.L. "Vapor analysis of binary explosive mixtures." Presented at the Naval CIED Knowledge Network, Dahlgren, VA, June 2015.

DeGreeff, L.E., Newsome, G.A., Katilie, C.J., Johnson, K.J., Rose-Pehrsson, S. "Headspace analysis of hexamethylene triperoxide diamine." Presented at the Canine Science and Technology Workshop, Raleigh, NC; July 2014.

DeGreeff, L.E., Katilie, C.J., Malito, M., Brandon, A., Ananth, R., Steinkamp, F.L., Rose-Pehrsson, S. "Instrumental and biological detection of ammonium nitrate-based explosives." Presented at the Canine Science and Technology Workshop, Raleigh, NC; July 2014.

DeGreeff, L.E., Grime, M., Eckenrode, B. "Detection of volatile organic compounds in dried human blood by instrument and canine." Presented at the Florida International University Forensic Symposium, Miami, FL; March 2012.

DeGreeff, L.E., Snyder, D., Grime, M., Tipple, C.A., Eckenrode, B. "Detection of dried human blood by canine." Presented at Onsite Conference, Baltimore, MD; January 2012.

Furton, K.G., Brown, J.S., Beltz, K., Caraballo, N.I., DeGreeff, L.E. "Optimization of Canine Human Scent Detection and Improving Canine Performance and Consistency by Employing Field Calibrants." Presented at the Canine Science and Technology Forum; Imperial College, London, UK; April 2012.

DeGreeff. L.E., Kim, C.S. "The effect of particle size on copper uptake to iron oxyhydroxide nanoparticles as a function of pH." Presented at the 17th Annual Graduate Women in Science Conference, Orange, CA; March 2006.