

S. EDWARD LAW

Curriculum Vita

Position

Brooks Distinguished Professor *Emeritus*
Director of Applied Electrostatics Laboratory
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Technical Specialty

Research and development of electrostatics technology for agricultural and biological usages; airborne particulate technology for air-pollution abatement; liquid atomization and spray systems; electrostatic crop spraying; supplemental mass pollination systems; textile fiber coatings; biological applications of electric-discharge-generated ozone; ultraviolet-enhanced ozonation systems for wastewater treatment/recycling; ozone exposure and control in floricultural greenhouses; respirable dust abatement; electrostatic deposition of antimicrobial liquids for surface decontamination.

Professional Biography

S. Edward Law received the B.S., M.S. and Ph.D. degrees in Biological and Agricultural Engineering with minors in mathematics and physics from North Carolina State University. He conducted research on light-scattering properties of optically-dense biological-particulate systems in a Washington, D.C. instrumentation laboratory as a National Academy of Sciences *Postdoctoral Fellow*.

He gained further industrial research experience in charged-particulate technology and electrogasdynamics as *project leader* with Gourdine Environmental Systems, Inc. in New Jersey. He joined the University of Georgia Biological and Agricultural Engineering faculty in 1970, retired in 2006 as *Brooks Distinguished Professor*, was then rehired part-time at the academic rank of *Distinguished Professor Emeritus*, and continues to be responsible for research and development of electrostatics for beneficial agricultural, biological and industrial applications as Director *Emeritus* of the Applied Electrostatics Laboratory...currently focused upon food-safety and environmental issues.

Dr. Law is a member of the American Society of Agricultural and Biological Engineers, the Institute of Electrical and Electronics Engineers, the Electrostatics Society of America, the Institute of Physics, the International Ozone Association, the Institute for Liquid Atomization and Spray Systems, Sigma Xi, Tau Beta Pi and Phi Kappa Phi. He has been awarded the *Creativity in Research Medal* by the University of Georgia Research Foundation as well as its *Inventor of the Year Award* and has received from his college the *Brooks Award for Excellence in Research*. Professor Law's engineering developments have been awarded 24 domestic and foreign patents; the ASABE has twice recognized outstanding commercialized agricultural-machinery products (www.electrostaticspraying.com) resulting from his licensed patents by international *AE50 Awards*. Additionally, his over 140 peer-reviewed scientific publications have received ten *Superior Paper Awards* (top 2 ½ %) from the ASABE and the IEEE. He is a *Fellow in ASABE* and has received its *Cyrus McCormick Gold Medal Award* ... "for exceptional and meritorious engineering achievement in agriculture". He has also been elected to *Fellow in IEEE* ... "for contributions to electrostatics technology for agricultural and biological applications" ... (selection is limited to 0.1% of international membership annually). The Electrostatics Society of America presented him its *Lifetime Achievement Award* in 1998, its *Educator of the Year Award* in 2011 and its *Honorary Life Member Award* in 2013. In 1996 Professor Law was inducted into the membership of the American *National Academy of Engineering*.

Recent Publications (selected January 2013 from over 140)

- Bolton, Stephanie L., Grishma Kotwal, Mark A. Harrison, S. Edward Law, Judy A. Harrison and Jennifer L. Cannon. 2013. Sanitizer efficacy against murine norovirus, a surrogate for human norovirus, on stainless steel surfaces when using three application methods. *Applied and Environmental Microbiology* 79(4):1368-1377. Available online at <http://aem.asm.org/content/79/4/1368>.
- Wetzstein, Hazel W. and S. Edward Law. 2012. Enhanced visualization of the fine structure of the stigmatic surface of citrus using pre-fixation washes. *Jour. Amer. Soc. Hort. Sci.* 137(5):290-293. Available online at <http://journal.ashspublications.org/content/137/5/290.full.pdf?ijkey=4ozB7hqFGy0UvRL&keytype=ref>.
- Lyons, Shawn M., Mark A. Harrison and S. Edward Law. 2011. Electrostatic application of antimicrobial sprays to sanitize food handling and processing surfaces for enhanced food safety. *Refereed Proceedings of 13th Internat. Conf. on Electrostatics. British Inst. of Physics. Jour. of Physics: Conf. Ser.* No. 301 (2011) 012014. Available online at <http://dx.doi.org/10.1088/1742-6596/301/1/012014>.
- Law, S. Edward. 2010. Air-assisted, electrostatic-induction, crop-spraying technology: Review of basic physics and engineering underlying the reduced-volume, reduced-diameter deposition process. *American Chemical Society Picogram* 78(AGRO 302):142.
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- Law, S. Edward and D. Ken Giles. 2009. Electrostatic abatement of airborne respirable dust emission from mechanized tree-nut harvesting: theoretical basis. *Jour. of Electrostatics* 67:84-88.
- Scherm, Harald, Amy T. Savelle and S. Edward Law. 2007. Effect of electrostatic spray parameters on the viability of two bacterial biocontrol agents and their deposition on blueberry flower stigmas. *Biocontrol Sci. and Tech.* 17(3):285-293.
- Law, S. Edward. 2006. Electrostatic application of carpet yarn spin finishes as a strategy for reducing environmental water pollution: theoretical basis. *IEEE Trans.* IA-42(5):1133-1138.
- Cooper, Steven C. and S. Edward Law. 2006. Electrostatic sprays for sunless tanning of the human body. *IEEE Trans.* IA-42(2):385-391.
- Law, S. Edward and Hazel Y. Wetzstein. 2006. Ambient ozone concentrations measured in floricultural greenhouses. ASABE Paper No. 064099, American Society of Agricultural & Biological Engineers Internat. Conf., Portland, OR. 12 pp.
- Law, S. Edward and Harald Scherm. 2005. Electrostatic application of a plant-disease biocontrol agent for prevention of fungal infection through the stigmatic surfaces of blueberry flowers. *Jour. of Electrostatics* 63(5):399-408.
- Yi, Weiguang, S. Edward Law, Dennis McCoy and Hazel Y. Wetzstein. 2005. Stigma development and receptivity in almond (*Prunus dulcis*). *Annals of Botany* 97:57-63.
- Law, S. Edward, Steven C. Cooper and Mark A. Harrison. 2004. Electrostatic spray application of decontaminant agents onto the human body as a bioterrorism countermeasure: process development and evaluation. *Refereed Proceedings of the 2003 Internat. Conf. on Electrostatics. British Inst. of Physics Conf. Ser. No. 178 (Section 7):331-336.* ISBN 0-7503-0949-0.
- Law, S. Edward and Steven C. Cooper. 2004. Electrostatic spray nozzles for abrasive and conductive liquids. European Patent No. EP 0 837 735. Issued Feb. 25. European Patent Office, Germany.
- Yi, Weiguang, S. Edward Law and Hazel Y. Wetzstein. 2003. An in vitro study of fungicide effects on pollen germination and tube growth in almond. *HortScience* 38(6):1086-1088.
- Yi, Weiguang, S. Edward Law and Hazel Y. Wetzstein. 2003. Polyester and nylon powders as pollen diluents preserve pollen germination and tube growth in controlled pollination. *Sexual Plant Reproduction* 15:265-269.
- Diaz, Michael E., S. Edward Law and Dawn M. Birt. 2002. Microbiological benefits of removing foam formed after UV-enhanced ozonation of poultry-processing chiller water for recycling. *Jour. Food Sci.* 67(3):1036-1042.
- Law, S. Edward and Steven C. Cooper. 2001. Air-assisted electrostatic sprays for postharvest control of fruit and vegetable spoilage microorganisms. *IEEE/IAS Trans.* IA-37(6):1597-1602.
- Law, S. Edward and Michael E. Diaz. 2001. Implementation of UV-enhanced ozonation for recycling food-processing wastewaters: mobile prototype case study. *Proc. 15th World Congress of Internat. Ozone Assoc.* 2:306-312. London, UK.

- Law, S. Edward. 2001. Agricultural electrostatic spray application: a review of significant research and development during the 20th century. *Jour. of Electrostatics* 51(1):25-42.
- Cooke, J. Robert and S. Edward Law. 2001. Finite-element analysis of space-charge suppression of electrostatic-induction spray charging. *IEEE Trans. IA-37(3)*:751-758.
- Perkins, W.S., S.E. Law, M.C. Smith, P.V. Winger and P.J. Lasier. 2001. Biological treatability and environmental impact of ozonation of spent reactive dyebaths. *Textile Chemist and Colorist* 1(2):39-43.
- Diaz, Michael E., S. Edward Law and Joseph F. Frank. 2001. Control of pathogenic microorganisms and turbidity in poultry-processing chiller water using UV-enhanced ozonation. *Ozone Sci. and Engr.* 23(1):53-64.
- Law, S. Edward, Hazel Y. Wetzstein, S. Banerjee and D. Eisikowitch. 2000. Electrostatic application of pollen sprays: effects of charging field intensity and aerodynamic shear upon deposition and germinability. *IEEE Trans. IA-36(4)*:998-1009.
- Beuchat, L.R., R. Chmielewski, J. Keswani, S.E. Law and J.F. Frank. 1999. Inactivation of aflatoxigenic *Aspergilli* by treatment with ozone. *Lett. Appl. Microbiol.* 29:202-205.
- Law, S. Edward, Steven C. Cooper and Whitney B. Law. 1999. Bipolar spray charging for enhanced deposition onto nonconductive and electrically isolated targets. *Proc. 1999 Cambridge Univ. Conf. on Electrostatics. British Inst. of Physics Conf. Ser.* No. 163:243-248. ISBN 0-7503-0638-6.
- Balachandran, W., Sidney A. Thompson, S. Edward Law and W. Machowski. 1999. Electrical characteristics of an electrostatic valve used for bulk transport of agricultural seeds. *IEEE Trans. IA-35(2)*:339-345.
- Law, S. Edward and Steven C. Cooper. 1998. Electrostatic-induction spray-charging nozzle system. U.S. Patent No. 5,765,761. Issued June 16. Washington, DC.
- Law, S. Edward and Hazel Y. Wetzstein. 1998. Pneumatic atomization and induction spray charging of aqueous based viable pollen suspensions. *Proc. 11th Conf. of Inst. for Liquid Atomization and Spray Systems*, pp. 480-482. Sacramento, CA.
- Banerjee, S. and S. Edward Law. 1998. Characterization of chargeability of biological particulates by triboelectrification. *IEEE Trans. IA-34(6)*:1201-1205.
- Hitchcock, D.R., S. E. Law, J. Wu, and P.L. Williams. 1998. Determining toxicity trends in ozonation of synthetic dye wastewaters using the nematode *Caenorhabditis elegans*. *Archives of Environ. Contamin. and Toxicology* 34:259-264.
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- Cooper, Steven C. and S. Edward Law. 1998. Electrostatic spray nozzles for abrasive and conductive liquids in harsh environments. U.S. Patent No. 5,704,554. Issued January 6. Washington, DC.
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- Johnson, Robert K., R.C. Anantheswaran and S. Edward Law. 1996. Electrostatically-enhanced atomization for spray drying of milk. *Lebensmittel-Wissenschaft und – Technologie* 29:71-81.
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- Thompson, Sidney A., S. Edward Law and W. Balachandran. 1995. Metering of bulk materials with an electrostatic valve. *Trans. of ASAE* 38(4):1189-1194.
- Law, S. Edward. 1995. Electrostatics technology for agricultural and biological applications: status and trends. (4th Bill Bright Memorial Invited Opening Lecture.) *Proc. 1995 Oxford Univ. Conf. on Electrostatics. British Inst. of Physics Conf. Ser.* No. 143 (Section 1):1-12. ISBN 0 7503 03379.

