

Hala I. Chaoui

halayc@gmail.com
(416) 949-5944

EDUCATION AND ACCREDITATION

Ohio State University, Columbus, OH

Ph.D. in Agricultural and Biological Engineering, December 2005, G.P.A. 3.54 (4.0 scale)

Thesis published in the Biosystems Engineering Journal (2008)

National Council of Examiners for Engineering and Surveying, Clemson, South Carolina

Fundamentals of Engineering License, April 2005, score 81 (100 scale)

University of Maine, Orono, ME

M.S. in Plant and Soil Science, June 2000, G.P.A. 3.42 (4.0 scale)

Thesis published in the Soil Biology and Biochemistry Journal (2003), cited 86 times

American University of Beirut, Beirut, Lebanon

B.S. in Agriculture and Diplôme d'Ingénieure Agricole, June 1996

Grand Lycée Franco-Libanais, Beyrouth, Liban

French and Lebanese Baccalaureate, June, 1991

Baccalauréat Français et Baccalauréat Libanais, Juin 1991

WORK AND RESEARCH EXPERIENCE

Urban Farms Organic Inc., Toronto, ON

Principal, October 2009 - present

- Developed, patented and currently marketing a modular “Earthworm System” that optimizes biodegradable waste processing. The compact, light-weight design fits in urban and vertical farms, and processes residential food waste on site.
- Testing and patenting a developed electric earthworm separator, in collaboration with a prototyping lab at the University of Toronto (ddimit.org, Dr. Matthew Ratto).
- Developed an appliance that reduces biological activity, nitrogen content and odors in food scraps
- Applied for an Organic Farming Research Foundation grant to test the modular and adobe-engineered “Earthworm System”, in collaboration with Ryerson University’s Urban Agriculture program (Dr. June Komisar).
- Created two excel applications that automatically design a scientifically optimized system for processing waste through earthworms. This freeware is available at www.urbanfarmsorganic.com/applications.html
- Contributor to the magazine “Innovative-science.com”, first article is on technologies available for urban and vertical organic agriculture (2010).
- Created a company website including outreach material www.urbanfarmsorganic.com
- Winner of a workspace lease at the Center for Social Innovation (business incubator), 2010 Toronto.
- Finalist in a business plan competition at the MaRS business incubator, 2010 Toronto.
- Conducted primary market research, to gauge the demands of users and define the design constraints of a new waste processing system.

The Ontario Ministry of Agriculture, Farming and Rural Affairs, Alfred, ON

Air Quality Research Engineer, 22nd June 2009 – 11th September 2009

- Published factsheet on vermicasting (vermicomposting)
- Revised fact sheets on the effect of air quality on animal and human health.
- Participated in projects related to greenhouse gases mitigation in animal facilities, biodigesters, and biomass storage.
- Participated in consulting for animal welfare in organic free-range dairy production.

The University of Illinois, Energy Biosciences Institute, Champaign, IL

Post doctorate researcher, 25th March 2008 – 15th June 2009

- Modeled storage of biomass feedstock for cellulosic ethanol production, as part of an engineering team-project to optimize biomass handling from the field to the processing plant.

- Conducted experiments to optimize biomass storage parameters.
- Evaluated mechanical properties of biomass (*Miscanthus* and *Switchgrass*), data used to optimize a storage biomass model.

The Pennsylvania State Univ., Agricultural and Biological Engineering Dept., State College, PA
Post doctorate researcher, 24th July 2006 – 24th March 2008

- Designed lab scale digesters and experiments to evaluate the effect of stirring frequency on methanogenesis in single-phase batch anaerobic digesters. Results presented at the “Progress in Biogas” conference in Stuttgart, 2007 and the ASABE annual meeting in Rhode Island, 2008.
- Designed experiments to evaluate greenhouse gas emissions through biofilters placed on stacked animal waste, and microbial respiration in the biofilters.
- Results presented at ASABE’s annual meeting in 2007, and pending publication in peer reviewed journal.
- Designed and co-built wooden structure holding 25 tons of animal waste in the field, as an experimental set up. Conducted experiments to derive empirical coefficients for the speciation and mass transfer of ammonia, compared empirical and model-derived results. Results submitted to transactions of ASABE.
- Served as an undergraduate thesis advisor: advisee completed an undergraduate thesis on the effect of biofilters on stacked manure temperatures. Mentored the student in processing and analyzing data, and thesis write up
- Lab coordinator, co-developed a wiki-based lab management system.

University of Florida Citrus Research Station, Agricultural Engineering Dept., Lake Alfred, FL
Post doctorate researcher, April 2006 – 15th July 2006

- Programmed algorithms to extract relevant data from a real-time data logging citrus yield monitor.
- Designed and conducted experiments to contrast capacitor-based, TDR and Echo soil moisture sensors.

Food, Agricultural and Biological Engineering Dept., Ohio State University, Columbus, OH
Post doctorate researcher, January 2006 – March 2006

- Conducted review and sensitivity analysis on mathematical models of odor dispersion from livestock.

PhD research, January 2001 – December 2005

- Created design models for the process of repelling earthworms from organic media using an electric field. Designed and conducted experiments used to calibrate the design models, and evaluate the effectiveness of electric fields at repelling earthworms. The resulting design models are applicable to streamlining biodegradable waste processing.
- Disseminated results at conferences and in the *Biosystems Engineering Journal*. PhD work cited in websites of private companies and NGO’s. Dissertation available Online at Electronic Theses and Dissertations from OhioLINK.
- Conducted PhD research on independent topic. Completed in 4 years Crop Science and Agricultural and Biological Engineering PhD curriculum, including courses in molecular biology techniques, crop physiology, precision agriculture, and the fundamentals of engineering.
- Filed invention disclosure for the design model of an electric earthworm separator and an excel program to generate optimized feedstock mixes.
- Audited MBA classes, led product development and business plan competitions teams.
- Developed teaching philosophy based on a Professional Development course and on teaching experience.

Graduate assistant, June 2002 – December 2005

- Performed spatial data analysis using map algebra in ArcGIS.
- Developed and maintained websites on Precision Agriculture and performed literature review on subjects varying from turf grass research to wireless communication systems.

Center for Middle Eastern Studies, Ohio State University, Columbus, OH

Language instructor, August 2000 – May 2001

- Taught and created handouts for 3 levels of language courses. 14% higher than average student evaluation

Soil Ecology Lab, Ohio State University, Columbus, OH

Research assistant, July 2000 - September 2000

- Developed and performed an experiment demonstrating plant disease suppression due to earthworm casts. Disseminated results at conferences. Provided support to other researchers through data collection.

The University of Maine, Plant and Soil Science Dept., Orono, ME

Master's research, January 1998 – June 2000

- Independent research topic; the performance of earthworm casts as a plant nutrient source. Analytical work included soil microbial biomass analysis, microbial respiration assays and gas chromatography.
- Disseminated results at conferences and in the Soil Biology and Biochemistry Journal (8th most downloaded article in 2003, cited 25 times).
- Re-organized Soil Microbiology Lab.

Cutflower Production “Relais d’Art”, Beirut, Lebanon

Production developer and manager, September 1996 – May 1997

- Compiled plant maintenance schedules based on Dutch cut flower industry practices, creating an improved plant growing protocol. Implemented protocol in the field with a greenhouse crew. Reorganized warehouse.

PUBLICATIONS

Refereed:

Chaoui, H., Zibilske, L.M. and Ohno, T. 2003. Effect of Earthworm Casts and Compost on Soil Microbial Activity and Plant Nutrient Availability. *Soil Biology and Biochemistry*, 35, 295-302. *8th most downloaded article in Soil Biology and Biochemistry Journal, 2003. Cited 86 times, 44 times in refereed articles. [Referenced by the National Research Council of Canada.](#)*

Chaoui, H. and Keener, H.M. 2008. Modeling the effectiveness of an electric field at repelling earthworms. *Biosystems Engineering*, 100 (3), 409-421. <http://dx.doi.org/10.1016/j.biosystemseng.2008.04.009>

Chaoui, H., Montes, F., Rotz, C. A. and Richard, T.L. 2009. Volatile Ammonia Fraction and Flux from Thin Layers of Buffered Ammonium Solution and Dairy Cattle Manure. *Transactions of the ASABE*. 52(5): 1695-1706.

Montes, F., Rotz, C. A., Chaoui, H. 2009. Process Modeling of Ammonia Volatilization from Ammonium Solution and Manure Surfaces: A Review with Recommended Models. *Transactions of the ASABE*. 52(5): 1707-1720.

Refereed conference proceedings:

Chaoui, et al., 2002. Suppression of the plant diseases, Pythium (damping-off), Rhizoctonia (root rot) and Verticillium (wilt) by Vermicomposts. *Proceedings of Brighton Crop Protection Conference- Pests and Diseases. Vol II, 8B-3, 711-716. Cited 29 times, 6 times in refereed articles.*

Chaoui, H., Brugger, M. 2007. A review and sensitivity analysis of odor setback distance models. *International Symposium on Air Quality and Waste Management for Agriculture. September 15-19, 2007 in Broomfield, Colorado.*

Popular Science and factsheets:

Chaoui, H. 2010. Why urban farming needs to be organic, *Innovative Science*, 1, 21-26. <http://www.innovative-science.com/our-science-magazine>

Chaoui, H. 2010. Vermicasting (Vermicomposting). Ontario Ministry of Agriculture, Food and Rural Affairs. <http://www.omafra.gov.on.ca/english/engineer/facts/10-009.htm>

Conferences:

Chaoui, H and Sorensen, C.G. 2010. Review of Technological Advances and Technological Needs in Ecological Agriculture (Organic Farming). CIGR and AGM annual meeting, Québec City (2010). <http://www.bioeng.ca/publications/meetings-papers?sobi2Task=sobi2Details&catid=21&sobi2Id=377>

Chaoui, H, Eckhoff, S., Hu, M-C, and Ting, K.C. 2009. Designing a biomass storage system: part of a biomass production system. ASABE Annual International Meeting, Reno, Nevada (2009).

Chaoui, H, Montes, F. and Rotz, A. 2008. Dissociation and Mass Transfer Coefficients for Ammonia Volatilization Models.. ASABE Annual International Meeting, Providence, Rhodes Island (2008).

Chaoui, H. 2008. Review of Innovative Technologies for Organic Farming. ASABE Annual International Meeting, Providence, Rhodes Island (2008).

Chaoui, H., Richard, T. 2007. Effect of mixing frequency on biogas yield in biodigesters. *International*

conference on progress in biogas, Stuttgart, Germany (2007). And the ASABE Annual International Meeting, Providence, Rhodes Island (2008).

- Chaoui, H., Topper, P., Graves, R., Bruns, M.A., and Richard, T. 2007. The effect of compost and earthworms casts biofilters on dairy manure stack emissions. ASABE Annual International Meeting, Minneapolis, Minnesota (2007).
- Chaoui, H. and Keener, H.M. Testing and Modeling the Effectiveness of an Electric Field at repelling earthworms. ASABE Annual International Meeting, 2006.
- Ehsani, R., Chaoui, H., Grejner-Brzezinska, D and Sullivan, M. 2006. A method of evaluating the performance of RTK GPS receivers used in Agriculture. Proceedings of the World Congress on Agricultural Engineering (2006) and Proceedings of the Automation Technology for Off Road Equipment Conference (2006).
- Chaoui, H, Keener, H. M., Ehsani, R. 2005. Modeling the Effectiveness of an Electric Field at repelling earthworms. ASABE Annual International Meeting, Tampa, Florida (2005).
- Chaoui, H. and Ehsani, R. 2004. Developing Field Containment Techniques of Earthworms to Increase Organic Fertilizer Efficiency. ASABE Annual International Meeting, Ottawa, Canada (2004).

HONORS, AWARDS AND PROFESSIONAL SOCIETIES

- Alpha Epsilon Honor society of Agricultural, Food and Biological Engineering.
- Gamma Sigma Delta Honor Society of Agriculture.
- Contributor in Innovative-Science.com, online scientific journal
- Ray Professional Development Award at the Ohio State University, August 2005.
- Finalist in faculty search in Biological and Agricultural Engineering at North Carolina State University and Vermont University.
- 8th most downloaded article in Soil Biology and Biochemistry Journal, 2003. Cited 86 times, 44 times in peer reviewed papers.
- Publications cited 35 times in total since first published in 2002.
- American Society of Agricultural and Biological Engineers (ASABE) and The Canadian Society for Bioengineering (CSBE)

COMMUNICATION AND OUTREACH

- Offices held within ASABE and years served: Session organizer – 2005 to 2009; Ecological engineering committee member – 2005 to 2009; Ecological engineering officer; 2006 to 2009 (secretary, vice chair and chair, in subsequent years).
- Presentation on engineering solutions for cellulosic ethanol, Agronomy day at the University of Illinois,
- Lead an ASABE session on ‘Innovative technologies in organic farming’, 2005-2009.
- Created www.bioengineering.net, an online working group for creating innovative technologies in ecological agriculture (organic farming)
- Posted online reviews and studies on comparing earthworm casts and compost system.
- Consulting: Yelm Worms in Seattle and Village One Foundation. Both cited my research on their websites.
- Consulted on a vermicomposting feasibility study for an MBA student team in Bainbridge College, and offered an excel sheet programmed to generate optimized feed mixes for earthworms, later adapted by Green Mountain Technologies to a commercial software.
- Peer reviewer for the journals: Chemosphere, Ecological Engineering (2 papers), ASABE transactions, proceedings of the ASABE air quality symposium (2 papers), Computers and Electronics in Agriculture.
- Member of the Sustainable Agriculture Working group at Penn State (2007). Represented my department at Ohio State in a University-wide Bioenergy meeting and briefed my department afterwards (2005).
- Co-authored and coordinated 3 multidisciplinary grant proposals (PhD), one received 86% approval rate.
- Graduate student representative and co-founder of Swing Dance Club at the University of Maine.
- Volunteer in environmental and human rights campaigns.

LANGUAGES

- Fluent in English, French and in Arabic.

PROGRAMMING AND LABORATORY SKILLS

- Trained in microchip programming, Autocad, and have a certificate in intermediate level Solid Works.
- Programmed in Visual Basic, Assembly, AutoIt. Performed data analysis in SagataSR and spatial data with ArcGIS. Created Excel macros to process and analyze data.

- Wrote Excel program to extract and process relevant data from a greenhouse gases monitor (Penn State Univ.) and an algorithm for data processing from a data logging yield monitor (Univ. of Florida).
- Created websites including www.bioengineering.net. Fluent in Visio, Excel macros, Excel, Words, PowerPoint, Contribute, FrontPage. Intermediate in Latex.
- Laboratory analysis skills: mechanical properties of biomass (compression, tension, Karl Fisher moisture), gas chromatography, liquid carbon analysis, microbial respiration measurements with Oxitop sensors, gas monitoring with a photoacoustic sensor, extracting soil and plant samples for nutrient analysis.
- Trained in analytical chemistry and molecular biology methods including leaf extractions, protein assays, enzymatic assays, SDS-Page method, Western Blot, spectroscopy.

PATENTS AND COPYRIGHTS

- Modular, adobe-engineered device for optimizing waste processing by earthworms
- (in progress) Electric earthworm separator, based on PhD thesis, for streamlining waste processing by earthworms
- Excel application to generate optimal feedstock mixes for bio-processing
- Excel application to derive earthworms, time and volume requirement of vermicasting bins based on waste input rate.
- Excel application for the statistical separation of means based on least significant difference
- Software to log experimental research notes, and output the draft of a journal paper.