Hala I. Chaoui

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SUMMARY OF QUALIFICATIONS

- Developed hardware for vertical indoor systems that mitigates the humidity issue and pathogen susceptibility found in hydroponic.
- Created a water feedback loop in the form of micro controller-based circuits.
- Wrote Arduino code based on an adaptive algorithm that adjusts to the collected data.
- Applied a systems' approach and holistic design to vertical indoor garden designs.
- Designed, laser cut and 3D printed plastic and felt parts that that assemble into a flat-packed plant supporting-structure.
- Statistically analyzed data and created user-friendly excel tools to mine data.
- Developed and commercialized a suspended indoor garden.
- Prototyped a stackable vermicomposter as well as as a novel organic fertilizer spike.
- Created workflow systems for lab teams and used excel automation to streamline the work.
- Communicated research results to the public, wrote an OMAFRA factsheet.
- Designed, conducted and disseminated the results of experiments related to organic fertilizers.
- Managed two research labs including growth chamber experiments, field trials, and budgets.
- Bilingual certification (advanced plus) in French fluency from the Ontario Government.
- Graduate degrees in Plant and Soil Science and in Agricultural and Biological Engineering.
- Chair of ecological engineering committee and technical sessions organizer at ASABE.org.

PROFESSIONAL EXPERIENCE

Modular Farms / NHXT, Toronto, ON
R&D manager, February 2018 - present

- Developed a proof of concept for a vertical farming systems that limits water evaporation and can be fertilized organically. This mitigates the high relative humidity issues, pathogen susceptible and produce quality issues faced in hydroponic systems.
- Prototyped a precision-watered felt structure for growing plants, with a control circuit was based on a micro controller.
- Created an adaptive Arduino code that changes its parameters (such as moisture thresholds) in response to the collected data (such as water leaks).
- Designed and 3D-printed parts in Fusion as components of a flat-packed vertical garden that is fertilizer by percolating water through an organic cartridge.
- Created and trialed a condensed form of organic fertilizer pellets as a component of the fertilizer cartridge.
- Presented the completed prototype at a public review of the Autodesk entrepreneur in residence program (December 19th, 2018), which is where the work was completely remotely, for my employer.
- Rewrote a farm manual to systematically guide vertical farm user to understand and use their farms.

Urban Farms Organic Inc. (research and development business), Toronto, ON
Product developer, November 2015 - February 2018

- Developed and commercialized a light-weight, modular indoor suspended garden (at urbanfarmsorganic.com).
- Developed a vermicompost-based organic fertilizer stick.
- Prototyped and tested an adobe-designed, stackable,self-watered crate for vermicomposting.
- Technical writing for OCAD and NYU faculty (Nabil Harfoush and Natalie Jeremijenko): authored schematics and a literature review, to show the ecological, social and economic synergy between several urban gardening proposals to the city of Toronto.

Winfield Solutions Inc. (a Landolakes company), Toronto, ON
Technical seed manager and agronomist November 2014 - October 2015

- Programmed excel sheets to automatically help growers select the right plant varieties.
- Presented research data in layman's terms, to retail managers and marketing experts.
- Shared with management literature demonstrating the yield potential of organic agronomic crop, and the yield per input-efficiency of organic agriculture.

Urban Farms Organic Inc. (research and development business), Toronto, ON
Principal, January 2010 - March 2013

- Prototyped an electric earthworm separator, at the U of T ThingTank lab (ddimit.org, Matthew Ratto).
- Received two small business grants (Carrot Cash) to develop hardware for vertical farming.
- Wrote a vermicomposting factsheet for Toronto Balcony Blooms and taught workshops for Transition Toronto.

- Presented a paper on Technological Advances and Technological Needs in Ecological Agriculture (Organic and Urban Farming) at the CIGR and AGM annual meeting, Québec City (2010).
- Created excel applications for preparing earthworms feed mixes, and designing aerated earthworm containers.
- Guided student student projects for groups from the U of T Engineering Practices and Strategies class and managed 3 interns.

The Ontario Ministry of Agriculture, Farming and Rural Affairs, Alfred, ON
Substitute (3 months contract) Air Quality Research Engineer, June 2009 – September 2009

- Published factsheet on vermicasting (vermicomposting)
- Revised factsheets on the effect of air quality on animal and human health.

Academic research and teaching work
The University of Illinois, Champaign, IL, March 2008 – June 2009

- Coordinated and trained a research team and collaborated with other teams on optimizing biomass handling from the field to the processing plant.
- Designed and conducted experiments to model biomass losses during storage.
- Created a workflow chart to coordinate the lab staff analyzing samples.

The Pennsylvania State Univ., Ag. and Biol. Eng., State College, PA, July 2006 – March 2008

- Managed and optimized the work of a research lab team through workflow charts, excel automation and completed the work under budget.
- Designed experiments to reduce greenhouse gas emissions from manure through compost biofilters, presented results at ASABE's annual meeting in 2007.
- Served as an undergraduate thesis advisor. trained graduate and undergraduate research lab members.
- Committee Officer at Ecological engineering committee at ASABE (2006 – 2009) and organizer of an ASABE session on 'Innovative technologies in organic farming' (2005 to 2009).
- Designed a wooden structure holding 25 tons of animal waste in the field. Conducted experiments to test models of ammonia mass transfer. Results published in Transactions of ASABE.

University of Florida Citrus Research Station, Lake Alfred, FL, April 2006 – July 2006

- Designed and conducted experiments to contrast capacitor-based, TDR and Echo soil moisture sensors
- Wrote an algorithm for processing spatial data from a citrus harvester and yield monitor.

Food, Agricultural and Biological Engineering Dept., Ohio State University, Columbus, OH
January 2001– March 2006

- January - March 2006: Postdoc research and conference paper on odour emissions from organic waste
- Posted online reviews and studies on comparing earthworm casts and compost system.
- Created a tool that uses electricity to move earthworms out of the fertilizer they've generated from biodegradable waste.
- Consulted for Yelm Worms in Seattle, Village One Foundation, and a vermicomposting feasibility study.
- August 2004 - August 2005: Assisted in teaching precision agriculture and using the related software.

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

- Designed experiments to compare organic and synthetic fertilizers, presented at conferences and in the Soil Biology and Biochemistry Journal (8th most downloaded article in 2003, cited 100 times).
- Conducted plant experiments in growth chamber to evaluate different fertilizer types.

Cutflower Production "Relais d'Art", Beirut, Lebanon
Production developer and manager, September 1996 – May 1997

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

EDUCATION AND ACCREDITATION

- Ohio State University, Columbus, OH: *Ph.D. in Agricultural and Biological Engineering, December 2005*

Member of the American Society of Agricultural and Biological Engineers (ASABE), The Canadian Society for Bioengineering (CSBE) and Gamma Sigma Delta Honor Society of Agriculture.

- National Council of Examiners for Engineering and Surveying, Clemson, SC: *Fundamentals of Engineering License, April 2005*
- Ontario Government, March 2009: *Bilingual certification (advanced plus) in French fluency, July 2009*
- University of Maine, Orono, ME: *M.S. in Plant and Soil Science, June 2000*
- American University of Beirut, Beirut, Lebanon: *B.S. in Agriculture and Diplôme d'Ingénieure Agricole, June 1996*
- Lycée Franco-Libanais, Beirut, Lebanon: *French Baccalaureate, June 1991*