# KUO-HSIEN CHANG, PH.D.

**Passionate Agronomist & Proud Geek**


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## EXPERIENCE

### Research Associate & Postdoctoral Fellow

**University of Guelph**

Sep 2014 – Ongoing | Guelph, ON

- Developed LiDAR/camera, RTK GPS routing and automation for precision agriculture – the ground truth demonstrated the patentability, efficient data processing and low-cost at $500
- Acquired funding of $200,000 and collaborated with industrial partners and growers in Canada and China
- Built scalable load cell array, tensile meter, weather station and ML from nothing in 2014, $10,000 in each contract revenue in 2017
- Expanded the laboratory's R&D to interdisciplinary projects and saved $90 million yield loss annually for the provincial sod industry

### CEO & Cofounder

**DaoGrow – Digitalized, Automated & Organic GROWing system**

Apr 2012 – Sep 2014 | Guelph, ON

- Designed and manufactured the world's first LED panel with nine dynamic spectrum in 2012 for precision and intensive farming system
- Oversaw 10+ indoor farming companies working on hydroponics and provided solutions to solve their problems with patentable technologies – micro irrigation, nano fertilizer, camera and ML
- Worked on data assimilation to improve agricultural simulations and weather risk assessment using low-cost embedded sensor network and invisible super weather station/ultrasonic anemometer

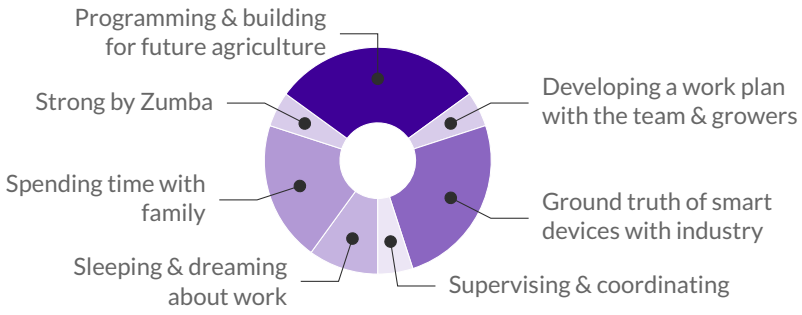
### Visiting Scientist & Postdoctoral Fellow

**University of Toronto**

Jan 2013 – Sep 2014 | Toronto, ON

- Improved a dynamic vegetation model significantly with tiny measurements of eddy-covariance fluxes and soil physical properties
- Extended R&D from crop to forest in every minor detail to increase knowledge of crop/plant physiology and carbon productivity
- Maximized my scientific computing skills by working with SciNet (Canada's largest supercomputer facility)

## A DAY OF MY LIFE




## LIFE PHILOSOPHY

*"To accomplish great things, we must not only act but also dream; not only plan but also believe."*

## MOST PROUD OF

**Courage I have**
to challenge and explore new domain knowledge as a father of three children

**Persistence & Loyalty**
I showed despite the hard moments and my willingness to stay with UoG Turf Lab after other job offers

**Industry's growth**
in adapting the system I developed to increase profits and productivity

**Inspiring growers in tech**
by clear communications using plain language with field demo

## STRENGTHS

Hard-working (18/24) | Purposeful | Persuasive | Postive & Motivative

Interdisciplinary – Meteorology, Agronomy
Scientific Programming – R, Python, Fortran
MVP Prototyping – Arduino, Particle, Phidget
ML & Cloud Computing – Google APIs

## EDUCATION

### Ph.D. in Land Resource Sciences

**University of Guelph**
**Colorado State University**

Sep 2006 – Jun 2011

### M.Sc. in Atmospheric Physics

**National Central University**

Sep 2001 – Jun 2003

### B.Sc. in Atmospheric Sciences

**Chinese Culture University**

Sep 1997 – Jun 2001

# PUBLICATIONS

## Thesis

- Chang, Kuo-Hsien (2011). *Modeling carbon dynamics for agriculture and deciduous forest ecosystem using the process-based model DayCENT and CN-CLASS*. Ontario, Canada: School of Environmental Sciences, University of Guelph.
- – (2003). *The evaluation of atmospheric long-range transportation of radioactive particles in East Asia*. TaoYuan, Taiwan: Department of Atmospheric Physics, National Central University.
- – (2001). *The impact of monsoon on economy and environment in Taiwan*. Taipei, Taiwan: Department of Atmospheric Sciences, Chinese Culture University.

## Journal Articles

- Chang, K., J. Powers, and E. Lyons (2017). "Water Restriction Impact on Surface Hardness and Soil Volumetric Water Content on Recreational Sports Fields". In: *International Turfgrass Society Research Journal* 13(11–12), pp. 1–5.
- Chang, K., D. Price, J. Chen, W. Kurz, et al. (2014). "Using DayCENT to Simulate Carbon Dynamics in Conventional and No-Till Agriculture". In: *Agricultural and Forest Meteorology* 198–199, pp. 142–154.
- Chang, K., J. Warland, P. Bartlett, M. Arain, and F. Yuan (2014). "A Simple Crop Phenology Algorithm in the Land Surface Model CN-CLASS". in: *Agronomy Journal* 106, pp. 297–308.
- Chang, K., J. Warland, P. Voroney, et al. (2013). "Using DayCENT to Simulate Carbon Dynamics in Conventional and No-Till Agriculture". In: *Soil Science Society American Journal* 77, pp. 941–950.
- Chang, K. and N. Lin (2004). "Risk assessment of long-range transport radioactive particles from nuclear power stations in East Asia". In: *Monthly Navy Academia* 38, pp. 10–20.

## Conference Proceedings

- Chang, K., P. Bartlett, et al. (2013). "Accounting the carbon budgets in agriculture and forests: current model framework and challenges". In: *The 9th International Carbon Dioxide Conference*.
- Chang, K., D. Price, J. Chen, E. Hogg, et al. (2013). "Simulating climate sensitivity of forest productivity and carbon stocks in the Canadian southern boreal region using a dynamic vegetation model". In: *The 4th NACP All Investigators Meeting*.
- Chang, K., C. Wagner-Riddle, et al. (2013). "Validating $CO_2$ fluxes and $\delta^{13}CO_2$ in land surface models for coupling with GEOS-Chem". In: *The 5th International GEOS-Chem Meeting*.
- Chang, K., J. Warland, P. Bartlett, M. Arain, P. Voroney, et al. (2011). "Modeling carbon dynamics in agriculture and forest ecosystems using process-based land surface scheme: DayCENT and CN-CLASS". in: *The CGU-CSAFM Meeting*. International Institute of Informatics and Systemics.

# LANGUAGES

**English**
**Chinese**

# REFEREES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