Ji Yeow Law

Environmental Research Engineer II
Department of Agricultural & Biosystems Engineering
Iowa State University
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EDUCATION

M.S. 2017 Iowa State University
Co-majors: Agricultural and Biosystems Engineering
Civil Engineering (Environmental)
GPA: 3.92/4.00

B.S. 2016 Iowa State University
Major: Agricultural Engineering
Minor: Agribusiness
Magna cum laude
GPA: 3.76/4.00

CERTIFICATION

Engineer in Training certified, NCEES ID: 16-537-61, Iowa, August 2016

PROFESSIONAL EXPERIENCES / ACHIEVEMENTS

Environmental Research Engineer II **2022 – present**
Environmental Research Engineer I **2018 – 2021**
Water Quality Research Lab
Department of Agricultural and Biosystems Engineering
Iowa State University, Ames, IA, USA

- Research, engineering, and analytical experiences
  - Designed new water quality monitoring networks for watershed-scale projects to monitor nutrient and sediment export.
  - Used hydrology and hydraulic model simulations to inform watershed management strategies required to achieve water quality goals.
  - Designed bench-scale research feasibility studies and successfully demonstrated enhanced bioreactor performance using alternative treatment approaches.
  - Developed sampling, analysis, and data management protocols for new and future/proposed projects related to environmental (soil and water) monitoring, treatment, and aquaculture.
  - Automated data management and analysis using Python and Excel VBA to ensure a consistent, high-quality workflow.
  - 6+ years of literature review experience on topics including but not limited to fate, transport, and treatment of pollutants in the environment and enclosed systems.
  - Provided formal external reviews for research manuscripts during the journal peer-review process, and informal internal reviews for research articles developed within the research group.
- Project management experiences

  - Managed bench-, pilot-, and watershed-scale projects, and involved in various tasks during the planning, implementation, and reporting phases.
  - Tracked project progresses, budgets, and deadlines, and reallocated resources as needed.
  - Collaborated with peers within/outside the organization and with local/state regulatory agencies to address higher-level issues.
  - Mentored or provided field training to undergraduate research assistants and interns.
- Fieldwork experiences
  - Identified suitable locations for new water monitoring stations for watershed-scale projects, and obtained permits to perform fieldwork on public and private properties.
  - Installed, maintained, and operated water monitoring sensors and stations.
  - Conducted watershed and other topography surveys using equipment such as RTK GPS, GNSS, and transit level.
- Writing experiences
  - Prepared grants/proposals as a co-PI, with over $500,000 funded environmental projects.
  - Published peer-reviewed articles to reputable journals as the lead or co-author.
  - Prepared progress and final project reports as the lead author.
  - Led the development of a watershed improvement plan as the lead author.
- Extension experiences
  - Developed extension materials to disseminate findings to non-technical audiences.
  - Presented annual project updates to watershed stakeholders, including landowners and local/state government agents.
  - Presented research projects to technical audiences in professional conferences.
  - Provided virtual workshops to high-school teachers across the United States.

Research Analyst Intern **Spring 2018**
Environmental Programs and Services & Analytics Teams
Iowa Soybean Association, Ankeny, IA, USA

- Assisted senior researchers in performing data analysis for state-wide research projects.
  - Evaluated bioreactor flow performance using hydraulic retention time model.
  - Modeled surface and subsurface flow and nitrogen loads from tile-drained agroecosystems using hydrology software (DRAINMOD).

Graduate Research Assistant **2015 – 2017**
Water Quality Research Lab
Department of Agricultural and Biosystems Engineering
Iowa State University, Ames, IA, USA

Master's research project title: Opportunities and challenges to use electrical stimulation for enhanced denitrification in woodchip bioreactors.

- Led the design process to develop electrically stimulated denitrification bioreactors, and successfully demonstrated improved bioreactor performance in feasibilities studies.
- Developed engineering drawings of the finalized bioreactor design for peer-reviewed publication.
- Responsible for daily operation, maintenance, and sampling of bioreactors.
- Performed data management, analysis, and interpretation of research data.
- Conducted techno-economic analysis to evaluate the cost feasibility of modified bioreactors compared to conventional bioreactors.

- Published peer-reviewed articles to reputable journals as the lead or co-author.
- Presented research projects to technical audiences in professional conferences.
- Successfully defended my public thesis presentation.

Research Intern **Summer 2015**
Bioprocess Lab
Department of Chemical Engineering
University of Malaya, Kuala Lumpur, Malaysia

- Assisted a research study to investigate the efficiency of enhanced biological phosphorus removal (EBPR) process in municipal wastewater treatment under tropical-temperature conditions.
    - Performed routine maintenance, sampling, and chemical analyses on sequencing batch bioreactors.
    - Produced a literature review report on extended aeration wastewater treatments systems.

Undergraduate Research Assistant **2014 – 2015**
Water Quality Research Lab
Department of Agricultural and Biosystems Engineering
Iowa State University, Ames, IA, USA

- Assisted studies on water and soil quality research.
    - Supported field construction, maintenance, and sampling for field-scale denitrification bioreactors at the research demonstration site.
    - Performed water sampling and maintenance for lab-scale denitrification bioreactors.
    - Performed soil/water sampling in corn-soybean research plots receiving poultry manure.
- Conducted chemical, biological, and physical analyses of soil/water samples in the laboratory.
- Developed engineering drawings of bioreactors for peer-reviewed publication.
- Published peer-reviewed article as the co-author.

Undergraduate Research Assistant **Summer 2014**
Soil Physics and Chemistry Labs
Department of Agronomy
Iowa State University, Ames, IA, USA

- Assisted a research study to assess the benefits of native prairie buffer strips on soil quality in agroecosystems.
    - Collected and analyzed soil samples to determine soil hydraulic conductivity, soil-water retention characteristics, and microbial biomass content.

AREAS OF EXPERTISE AND SKILLS

- Fate and transport analysis of water pollutants in the open environment and enclosed systems.
- Design, build, and evaluate modified water treatment systems for enhanced pollutant removal, which modifications included bioelectrical stimulation, and examining alternative carbon sources and sorbents.
- Field and laboratory instrumentation, which tasks included installation/calibration of pumps, high-frequency sensors, data loggers, and automated water samplers.

- Field surveys to gather data for topographic, stream cross-sectional area, lake bathymetry, and soil erosion assessments.
- Hydrology modelling to simulate pollutant transport for existing and target scenarios.
- Techno-economic analysis to evaluate cost efficiency and feasibility of alternative technology, practice, and process.
- Environmental data management and statistical analyses.
- Prepare technical documents (proposals, budgets, design drawings, maps, progress reports) for stakeholders within the consultancy and research environments.
- Prepare outreach documents (fact sheet, white paper) for non-technical stakeholders and communities.
- Prepare and publish peer-reviewed journal articles to support the advancement of scientific knowledge.
- Present project or research updates to collaborators, internal/external stakeholders, and scientific communities.

HARDWARE AND SOFTWARE

Water monitoring instruments	: *Teledyne ISCO, Solinst, HOBO*
Field survey equipment	: *Trimble RTK-GPS, Trimble GNSS, Transit Level*
Data management & analysis software	: *MS Excel, JMP, OriginLab*
Computer-aided design software	: *AutoCAD, SolidWorks, Autodesk Inventor*
Hydrology models	: *ArcGIS, BATHTUB, WEPP, Hydrus-1D*
Programming languages	: *VBA, Python*

LANGUAGES

English, Mandarin, Malay, Cantonese

AWARDS AND RECOGNITIONS

1. **International Student Ambassador Scholarship (2013-2016)**
   International Students and Scholars Office, Iowa State University
2. **Dean's list (all semesters 2013-2016)**
   Department of Agricultural and Biosystems Engineering, Iowa State University
3. **Alpha Zeta Agricultural Honors Society (2013-2016)**
   Wilson Chapter, Iowa State University

PROFESSIONAL AFFILIATIONS

1. American Society of Agricultural and Biological Engineers, member, 2016 – present
2. American Society of Agronomy, member, 2021 – present
3. American Water Resources Association, member, 2018

DIVERSITY, EQUITY, AND INCLUSION

1. Implicit Bias Workshop by Justin Brown, February 2021
2. Iowa State University Departmental Diversity, Equity, and Inclusion Training, January 2021
3. Picture a Scientist Documentary Discussion Group by ADVANCE Midwest Partnership – Joining Forces, October 2020
4. Iowa State University Departmental Diversity, Equity, and Inclusion Training, August 2020
5. Iowa State University Title IX Training – Supervisor, June 2020

6. Implicit Bias Workshop by Justin Brown, January 2020
7. Iowa State University Title IX Training – Non Supervisor, August 2018

PUBLICATIONS

1. **Law, J. Y.**, Long, L. A., Kaleita, A., Helmers, M., Brendel, C., van der Woude, K., & Soupir, M. (2022). Stacked conservation practices reduce nitrogen loss: A paired watershed study. Journal of Environmental Management, 302 Part A(114053). doi:10.1016/j.jenvman.2021.114053
2. **Law, J. Y.**, Brendel, C., Long, L. A., Helmers, M., Kaleita, A., & Soupir, M. (2020). Impact of stacked conservation practices on phosphorus and sediment export at the catchment scale. Journal of Environmental Quality, 1-12. doi:10.1002/jeq2.20140
3. Palmer, J. A, **Law, J. Y.**, Soupir, M. S. (2020). Spatial and temporal distribution of *E. coli* contamination on three inland lake and recreational beach systems in the upper Midwestern United States. Science of The Total Environment, 722, 137846. doi:10.1016/j.scitotenv.2020.137846
4. Hoover, N., **Law, J. Y.**, Long, L. A., Kanwar, R., & Soupir, M. (2019). Long-term impact of poultry manure on crop yield, soil and water quality, and crop revenue. Journal of Environmental Management, 252, 109582. doi:10.1016/j.jenvman.2019.109582
5. **Law, J. Y.**, Soupir, M., Raman, R., Moorman, T. B., & Ong, S. K. (2018). Electrical stimulation for enhanced denitrification in woodchip bioreactors: Opportunities and challenges. Ecological Engineering, 110, 38-47. doi:10.1016/j.ecoleng.2017.10.002
6. Soupir, M., Hoover, N., Moorman, T. B., **Law, J. Y.**, & Bearson, B. (2018). Impact of temperature and hydraulic retention time on pathogen and nutrient removal in woodchip bioreactors. Ecological Engineering, 112, 153-157. doi:10.1016/j.ecoleng.2017.12.005
7. **Law, J. Y.**, Soupir, M., Raman, R., & Moorman, T. B. (2018). Exploring multiple operating scenarios to identify low-cost, high nitrate removal strategies for electrically-stimulated woodchip bioreactors. Ecological Engineering, 120, 146-153. doi:10.1016/j.ecoleng.2018.05.001
8. **Law, J. Y.** (2017). Opportunities and challenges to use electrical stimulation for enhanced denitrification in woodchip bioreactors. Master of Science Thesis. Iowa State University, Ames, IA.
9. Hoover, N., Soupir, M., VanDePol, R., Goode, T., & **Law, J. Y.** (2017). Pilot-Scale Denitrification Bioreactors for Replicated Field Research. Applied Engineering in Agriculture, 33(1), 83-90. doi:10.13031/aea.11736

TECHNICAL REPORTS

1. Black Hawk Lake Watershed Project
   a. Paired watersheds water quality monitoring (2018 – 2019)
      - Semi-annual progress reports (2)
      - Final report (1)
   b. Paired watersheds and wetlands water quality monitoring (2020 – present)
      - Semi-annual progress reports (4)
2. McFarland Lake Watershed Project
   a. Watershed water quality monitoring (2019)
      - Final report (1)
   b. Watershed Improvement Plan (2020)
      - Watershed management plan (1)
3. Squaw Creek and East Indian Creek Project (2019)

a. Final report (1)

PRESENTATIONS

1. **Corncob-amended woodchip bioreactors improved nitrate removal rate and cost-efficiency**
   ASA, CSSA, SSSA International Annual Meeting 2021
   Salt Lake City, UT, USA
2. **Nutrient, sediment, and antimicrobial resistance bacteria/gene export from paired catchments with varying BMPs implementation.**
   Iowa Water Conference 2021
   Ames, IA, USA (moved to virtual format)
3. **Long term impact of poultry manure application on crop yield and soil and water quality.**
   American Society of Agricultural and Biological Engineers Annual International Meeting 2020
   Omaha, NE, USA (moved to virtual format)
4. **Impact of hydraulic residence time and woodchip properties on nitrate removal in pilot-scale woodchip bioreactors.**
   American Society of Agricultural and Biological Engineers Annual International Meeting 2019
   Boston, MA, USA
5. **Nutrient export from paired catchments with varying BMPs implementation.**
   American Society of Agricultural and Biological Engineers Annual International Meeting 2019
   Boston, MA, USA
6. **Impact of Conservation Practices on Nutrient and Antimicrobial Resistant (AMR) Bacteria Export.**
   Iowa State University Research Day 2019
   Ames, IA, USA
7. **Opportunities and challenges to use electrical stimulation in nitrate-removal woodchip bioreactors.**
   American Society of Agricultural and Biological Engineers Annual International Meeting 2017
   Spokane, WA, USA
8. **Opportunities and challenges to use electrical stimulation in denitrification woodchip bioreactors.**
   Iowa State University College of Agriculture & Life Sciences Sustainability Symposium 2017
   Ames, IA, USA
9. **Electrical Stimulation on Denitrifying Woodchip Bioreactor.**
   American Society of Agricultural and Biological Engineers Drainage Symposium 2016
   Minneapolis, MN, USA

EXTENSION/OUTREACH

Meetings

1. **Black Hawk Lake Watershed Annual Stakeholder meeting 2019, 2020, and 2021.**
   Annual meetings with watershed stakeholders, including landowners, state and local government agents, and non-profit agents to learn, engage, and present research findings.
2. **NSF Research Experiences for Teachers in Engineering and Computer Science Program July 2021.**
   Provided a virtual Innovative Practices Bioreactor Workshop to high school teachers across the United States.

Materials

1. **Integrated Conservation Practices and Black Hawk Lake Watershed (fact sheet).**
   A 4-page outreach fact sheet developed using research data to convey scientific knowledge to non-technical audiences, such as landowners and farmers. Intended to increase awareness and to encourage adoption of conservation practices.
2. **The impact of stacked conservation practices on nitrogen, phosphorus, and sediment loading at the subwatershed level (white paper).**
   A 9-page outreach whitepaper developed using research data to convey scientific knowledge to semi-technical audiences, such as conservation agencies. Intended to guide conservation efforts based on science.

GRANTS/PROPOSALS

Total funded projects - $528,850

1. **Forest-to-Farm: An innovative network to diversify wood product markets, encourage sustainable forest management, and enhance water quality.**
   USDA NRCS Wood Innovation Grant
   $482,432
   Submitted 2022, pending
   Beck, W. (PI), Soupir, M., Law, J. Y.
2. **National Water Quality Initiative Monitoring in the Black Hawk Lake Watershed – Phase II b.**
   USEPA, USDA NRCS NWQI program
   $168,414
   6/30/21 to 12/31/22
   Soupir, M. (PI), Kaleita, A., Helmers, M., Law, J. Y., Long, L. A.
3. **National Water Quality Initiative Monitoring in the Black Hawk Lake Watershed – Phase II a.**
   USEPA, USDA NRCS NWQI program
   $121,166
   2/5/20 to 6/30/21
   Soupir, M. (PI), Kaleita, A., Helmers, M., Law, J. Y., Long, L. A.
4. **McFarland Park Lake Watershed Management Plan.**
   Story County Conservation Center
   $12,513
   7/08/20 to 3/31/21
   Soupir, M. (PI), Law, J. Y.
5. **McFarland Park Lake Monitoring.**
   Story County Conservation Center
   $7,098
   2/25/19 to 12/31/19
   Soupir, M. (PI), Law, J. Y.
6. **Data analysis for nutrient, sediment, and pathogen export in Squaw Creek and East Indian Creek.**
   Prairie Rivers of Iowa
   $5,432
   1/22/19 to 3/15/19
   Soupir, M. (PI), Law, J. Y.

7. **Continued assessment of corn cobs as an alternative carbon source to enhance bioreactor performance for improved water quality.**
   Iowa Nutrient Research Center
   $121,673
   8/15/21 to 8/15/23
   Soupir, M. (PI), Hoover, N., Law, J. Y., Isenhart, T., Davis, M.
8. **Corn cobs as an alternative carbon source to enhance bioreactor performance for improved water quality.**
   Iowa Nutrient Research Center
   $92,554
   7/1/18 to 6/30/20
   Soupir, M. (PI), Law, J. Y., Isenhart, T., Davis, M.
9. **Forest-to-Farm: Innovative carbon media and supply network for enhanced bioreactor adoption and performance.**
   USDA NRCS CIG program
   $600,672
   Submitted 2021, not funded
   Beck, W. (PI), Soupir, M., Law, J. Y.
10. **Continued assessment of corn cobs as an alternative carbon source to enhance bioreactor performance for improved water quality.**
    Iowa Nutrient Research Center
    $104,949
    Submitted 2020, not funded.
    Soupir, M. (PI), Hoover, N., Law, J. Y., Isenhart, T., Davis, M.
11. **Integrating low-cost, carbon-based denitrification into recirculating aquaculture systems.**
    USDA NIFA Special Research Grants Program: Aquaculture Research
    $299,046
    Submitted 2020, not funded.
    Soupir, M. (PI), Law, J. Y., Rosentrater, K.
12. **Low-Cost Nitrate Removal System in Recirculating Aquaculture System.**
    North Central Regional Aquaculture Center
    $258,950
    Submitted 2020, not funded.
    Soupir, M. (PI), Law, J. Y., Rosentrater, K., Christianson, L., Riecks-Soucek, D.

STUDENTS/TRAINEES MENTORED

1. **Tristan Balmer**
   Undergraduate Research Assistant, May 2021 – present
   Department of Agricultural and Biosystems Engineering, Iowa State University
2. **Lance Baetsle**
   High School Teacher, June – August 2018 and June – August 2019
   National Science Foundation Research Experiences for Teachers in Engineering and Computer Science