Chun-Peng James Chen

CONTACT INFORMATION

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SUMMARY

I am an assistant professor of animal data sciences in the School of Animal Sciences (SAS) at Virginia Tech. My research interests include deep learning, statistical genetics, and software development. I am particularly interested in developing data-driven stategies for solving real-world problems in precision livestock farming. My research also tightly integrates with indutrial applications. Currently, I am developing computer vision algorithms to model animal behaviors for better animal welfare and management.

EDUCATION

Washington State University, Pullman, Washington, USA   08/2016 - 05/2021
Ph.D., Crop Science
- *Thesis*: A Paradigm Shift in Breeding: From Genomics to Phenomics
- *Advisor*: Dr. Zhiwu Zhang

National Taiwan University, Taipei, Taiwan   09/2010 - 06/2014
B.S., Agronomy

PROFESSIONAL POSITIONS

Assistant Professor (70% Research and 30% Teaching)   07/2022 - Present
School of Animal Sciences, Virginia Tech
Blacksburg, Virginia, USA

Affiliated Faculty Member   01/2022 - Present
Center for Advanced Innovation in Agriculture (CAIA), Virginia Tech
Blacksburg, Virginia USA

Assistant Professor (70% Research and 30% Teaching)   01/2022 - 06/2022
Department of Animal and Poultry Sciences, Virginia Tech
Blacksburg, Virginia, USA

Postdoctoral Associate (*Advisor*: Dr. Hao Cheng)   03/2021 - 12/2021
Department of Animal Science, University of California, Davis
Davis, California, USA

Graduate Research Assistant   08/2016 - 12/2020
Department of Crop and Soil Sciences, Washington State University
Pullman, Washington, USA

Biostatistician Intern   06/2019 - 08/2019
Department of Research and Development, BASF
West Sacramento, California, USA

Research Assistant   04/2016 - 06/2016
Institute of Plant and Microbial Biology, Academia Sinica
Taipei, Taiwan

Data Analyst   10/2015 - 03/2016
Yu-Shun International Cultural CO., LTD

Taipei, Taiwan

Corporal   10/2014 - 09/2015
564 Armor Brigade, 8th Army Corps, Republic of China Army
Taipei, Taiwan

**EDITORIAL
ACTIVITIES**

Ad Hoc Reviewer
- Number of manuscripts reviewed per journal:
     Bioinformatics (1),
     Crop & Pasture Science (1),
     Frontier in Genetics (1),
     Journal of Animal Science (1),
     Journal of Dairy Science (3),
     PLoS One (1)
- Number of manuscripts reviewed per year:
     2018(1), 2019(2), 2021(1), 2022(2), 2023(2)

**GRANTS DIRECTED
OR CO-DIRECTED**

External Competitive Grants

United State Department Agriculture (USDA) - NIFA - DSFAS   09/2023 - 08/2028
Principal Investigator $649,741
2022-11638 Acoustic data as a novel trait to manage welfare and environmental impact in precision cow farming.

Washington Wheat Foundation   11/2018 - 07/2019
Principal Investigator $3,238
Instant and non-destructive prediction of wheat Hagberg falling number from hyperspectral imaging by using parallel computation with graphics processing units (GPU)

Internal Competitive Grants

2023 CALS Integrated Internal Competitive Grants Program   07/2023 - 06/2024
Principal Investigator $30,000
Ant Detective: Automated Computer-Vision-Based Kit to Prevent the Spread of Invasive Species

Center for Advanced Innovation in Agriculture (CAIA)   03/2022 - 06/2022
Principal Investigator $4,000
Agricultural Leadership for Cyberbiosecurity: A Teaching Case Study

Peer-Reviewed Research Journal Articles

12. **Chen, Chun-Peng James**, Y. Hu, X. Li, C. F. Morris, S. Delwiche, A. H. Carter, C. Steber, and Z. Zhang, 2023 An independent validation reveals the potential to predict Hagberg–Perten falling number using spectrometers. The Plant Phenome Journal **6**: e20070

11. Massahiro Yassue, R., G. Galli, C.-P. James Chen, R. Fritsche-Neto, and G. Morota, 2023 Genome-wide association analysis of hyperspectral reflectance data to dissect the genetic architecture of growth-related traits in maize under plant growth-promoting bacteria inoculation. Plant Direct **7**: e492

10. **Chen, C. J.**, J. Rutkoski, J. C. Schnable, S. C. Murray, L. Wang, X. Jin, B. Stich, J. Crossa, B. J. Hayes, and Z. Zhang, 2023 Role of the Genomics-Phenomics-Agronomy Paradigm in Plant Breeding. In *Plant Breeding Reviews*, volume 46, pp. 622–668, WILEY

9. Chen, C. and G. Ferreira, 2022 Evaluation of walking activity data during pregnancy as an indicator of pregnancy loss in dairy cattle. JDS Communications p. S2666910222001466

8. **Chen, C. P. J.**, G. Morota, K. Lee, Z. Zhang, and H. Cheng, 2022 VTag: a semi-supervised pipeline for tracking pig activity with a single top-view camera. Journal of Animal Science **100**

7. **Chen, C. J.**, D. Garrick, R. Fernando, E. Karaman, C. Stricker, M. Keehan, and H. Cheng, 2022a XSim version 2: simulation of modern breeding programs. G3 Genes|Genomes|Genetics **12**

6. Hu, Y., S. M. Sjoberg, **Chen, C. J.**, A. L. Hauvermale, C. F. Morris, S. R. Delwiche, A. E. Cannon, C. M. Steber, and Z. Zhang, 2022 As the number falls, alternatives to the Hagberg–Perten falling number method: A review. Comprehensive Reviews in Food Science and Food Safety **21**: 2105–2117

5. Tang, Z., A. Parajuli, **Chen, C. J.**, Y. Hu, S. Revolinski, C. A. Medina, S. Lin, Z. Zhang, and L. X. Yu, 2021 Validation of UAV-based alfalfa biomass predictability using photogrammetry with fully automatic plot segmentation. Scientific Reports **11**: 3336

4. **Chen, C. J.** and Z. Zhang, 2020 GRID: A Python Package for Field Plot Phenotyping Using Aerial Images. Remote Sensing **12**: 1697

3. Liu, L., J. Zhou, **Chen, C. J.**, J. Zhang, W. Wen, J. Tian, Z. Zhang, and Y. Gu, 2020 GWAS-Based Identification of New Loci for Milk Yield, Fat, and Protein in Holstein Cattle. Animals **10**: 2048

2. Zhou, J., L. Liu, **Chen, C. J.**, M. Zhang, X. Lu, Z. Zhang, X. Huang, and Y. Shi, 2019 Genome-wide association study of milk and reproductive traits in dual-purpose Xinjiang Brown cattle. BMC Genomics **20**: 827

1. **Chen, C. J.** and Z. Zhang, 2018b iPat: intelligent prediction and association tool for genomic research. Bioinformatics **34**: 1925–1927

Peer-Reviewed Conference Proceedings

2. **Chen, C. J.**, G. Morota, and H. Cheng, 2022b VTag: Automatic pipeline to annotate video data for pig phenomics studies. The 12th World Congress of Genetics Applied to Livestock Production, Rotterdam, The Netherlands

1. **Chen, C. J.** and Z. Zhang, 2018a GWAS and GS Are as Easy as Clicking and Dragging with iPat. The 11th World Congress of Genetics Applied to Livestock Production, Auckland, New Zealand

**DEVELOPED
SOFTWARE**

4. **VTag: a semi-supervised pipeline for tracking pig activity with a single top-view camera**

   - Publication on *JAS*: https://doi.org/10.1093/jas/skac147
   - GitHub Repository: https://github.com/vt-ads/vtag

3. **XSimV2: A fast and user-friendly tool to simulate sequence data and complicated pedigree structures**

   - Publication on *G3*: https://doi.org/10.1093/g3journal/jkac032
   - GitHub Repository: https://github.com/reworkhow/XSim.jl
   - Documentation: https://reworkhow.github.io/XSim.jl/index.html

2. **GRID: A Python Package for Aerial High-Throughput Phenotyping**

   - Publication on *Remote Sensing*: https://doi.org/10.3390/rs12111697
   - GitHub Repository: https://github.com/Poissonfish/GRID
   - Software Page: http://zzlab.net/GRID
   - Documentation: https://poissonfish.github.io/GRID/index.html

1. **iPat: Intelligent Tool for Prediction and Association**

   - Publication on *Bioinformatics*: https://doi.org/10.1093/bioinformatics/bty015
   - GitHub Repository: https://github.com/Poissonfish/iPat
   - Software Page: http://zzlab.net/iPat
   - Documentation: https://poissonfish.github.io/iPat/index.html

Compiled on 2023-07-10

PRESENTATIONS

Conference Presentations

12. **American Dairy Science Association (ADSA) Annual Meeting** 06/2023
    Ottawa, Canada
    A computer vision strategy to alleviate cow mastitis and
    improve dairy farm sustainability

11. **The 12th World Congress on Genetics Applied
    to Livestock Production (WCGALP)** 07/2022
    Rotterdam, The Netherlands
    VTag: Automatic pipeline to annotate video data for pig phenomics studies

10. **American Dairy Science Association (ADSA) Annual Meeting** 06/2022
    Kansas City, Missouri, USA
    Evaluation of Walking Activity Data During Pregnancy as an Indicator
    of Pregnancy Loss in Dairy Cattle

9. **National Animal Genome Research Program (NRSP8)** 04/2022
   San Diego, California, USA
   VTag: a Semi-Supervised Pipeline for Tracking Pig Activity
   with a Single Top-View Camera

8. **Plant and Animal Genome (PAG) XXVIII** 01/2020
   San Diego, California, USA
   GRID: a Python Package for Aerial High-Throughput Phenotyping

7. **Wheat Quality Council** 01/2019
   Spokane, Washington, USA
   Toward Instant, Non-Destructive Prediction of Wheat Hagberg-Perten Falling Number

6. **Plant and Animal Genome (PAG) XXVII** 01/2019
   San Diego, California, USA
   Toward Instant, Non-Destructive Prediction of Wheat Hagberg-Perten Falling Number

5. **Plant and Animal Genome (PAG) XXVII** 01/2019
   San Diego, California, USA
   iPat: A Genomics Analysis Tool for Everyone

4. **The 11th World Congress on Genetics Applied
   to Livestock Production (WCGALP)** 02/2018
   Auckland, New Zealand
   GWAS and GS are as easy as clicking and dragging with iPat

3. **Plant and Animal Genome (PAG) XXVI** 01/2018
   San Diego, California, USA
   iPat: Intelligent Prediction and Association Tool for Genomic Research

2. **Plant and Animal Genome (PAG) Asia** 05/2017
   Seoul, korea
   iPat, a Versatile Tool for Genomics Studies

1. **Plant and Animal Genome (PAG) Asia** 05/2017
   Seoul, korea
   Segregation Analysis and Its Implementation in iPat

Intramural Seminars

Virginia Tech

6. **Animal and Poultry Sciences Seminar** 03/2022
   Leveraging Activity Data to Improve
   Pregnancy Diagnoses and Herd Assessments

UC Davis

5. **Animal Science Seminar** 12/2021
   VTag: a Semi-Supervised Pipeline for Tracking Pig Activity
   with a Single Top-View Camera

Washington State University

4. **Crop Sciences Ph.D. Exit Seminar** 04/2021
   A Paradigm Shift in Breeding: From Genomics to Phenomics

3. **Plant Sciences Retreat** 02/2021
   GRID: a Python Package for Aerial High-Throughput Phenotyping

2. **Plant Sciences Retreat** 03/2018
   GWAS and GS are as easy as clicking and dragging with iPat

1. **Crop Sciences Ph.D. Proposal Seminar** 11/2017
   Application of Random Forest in Genomics Selection

Lead Lectures

APSC-5984 Special Study: Agriculture Data Science 01/2023 - 05/2023
Virginia Tech

Short Courses and Workshop

Modeling Methods: Three types of risks in model validation 06/2023
Co-instructors: Dr. Robert Tempelman and Dr. Mark Hanigan
National Animal Nutrition Program (NANP):
Journal of Dairy Science, and JDS Communications Joint Workshop

Modern Programming in Genome to Phenome 08/2022
Co-instructors: Dr. Rohan Fernando and Dr. Hao Cheng
University of California, Davis

Guest Lectures

CropS 545 Statistical Genomics 05/2018
Introduction to Machine Learning and Ensemble Methods
Instructor: Dr. Zhiwu Zhang
Washington State University

CropS 545 Statistical Genomics 02/2017
Principal Component Analysis
Instructor: Dr. Zhiwu Zhang
Washington State University