CURRICULUM VITAE

ISAIAH CATALINO M. PABUAYON

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EDUCATION

- **Doctor of Philosophy in Plant and Soil Sciences, Major in Crop Science**
  Texas Tech University, Lubbock, TX
  - GPA: 4.00
  - Graduated December 2020
  - Focus on comparative and integrative plant biology that utilized systems-level approaches incorporating genetics, genomics, epigenetics, cellular and whole plant physiology, and biological computing and modeling
  - Dissertation title: "Physiological and Molecular Causes of Genetic Novelties: A Case Study on Transgressive Salinity Tolerance Across a Recombinant Inbred Population of Rice"

- **Bachelor of Science in Biology, Major in Genetics**
  University of the Philippines-Los Baños
  - Graduated in April 2011, *Cum Laude* (GWA: 1.58)
  - Completed thesis entitled "*In Silico* Determination of Differences Between Cytochrome C Oxidase 1 DNA and Protein Sequences Among Selected Mammalian Groups"

PROFESSIONAL EXPERIENCE

- Research Assistant Professor (November 2024 to present)
  - Department of Plant and Soil Science, Texas Tech University, Lubbock, TX
- Postdoctoral Research Associate (August 2023 to September 2024)
  - Department of Plant and Soil Science, Texas Tech University, Lubbock, TX
- Postdoctoral Research Associate (April 2022 to June 2023)
  - Department of Biological Sciences, Louisiana State University, Baton Rouge, LA
- Postdoctoral Research Associate (February 2021 to April 2022)
  - Department of Chemistry and Biochemistry, Texas Tech University, Lubbock, TX
- Graduate Research Assistant (January 2016 to December 2020)
  - Department of Plant and Soil Science, Texas Tech University, Lubbock, TX
- Researcher – Molecular Biology (June 2011 to December 2015)

- Plant Breeding, Genetics, and Biotechnology Division, International Rice Research Institute, Los Baños, Laguna, Philippines

AFFILIATIONS, SCHOLARSHIPS, AND HONORS RECEIVED

1. George Tereshkovich Plant and Soil Science Outstanding Doctoral Graduate, 2020-21 recipient
2. TTU Graduate School Doctoral Dissertation Completion Fellowship
    - Recipient from Fall 2020
3. Bayer Crop Science Graduate Fellowship
    - Recipient from Fall 2020
4. Harold and Mary Dregne Graduate Endowed Scholarship
    - Recipient from Spring 2017 to Fall 2020
5. Crop Science Society of America (Active member; 2022 to Present)
6. American Society of Agronomy (Active member; 2022 to Present)
7. American Society of Plant Biologists (2022 to 2023)
8. Phi Kappa Phi Honor Society
    - Member (Inducted 2011)
9. Phi Sigma Biological Honor Society
    - Member (Inducted 2011)
10. Gamma Sigma Delta Honor Society of Agriculture
    - Member (Inducted 2011)

PUBLICATIONS IN PEER-REVIEWED JOURNALS

1. Rottet S, Rourke LM, **Pabuayon ICM**, Phua SY, Yee S, Weerasooriya HN, Wang X, Mehra HS, Nguyen ND, Long BD, Moroney JV, Price GD (2024) Engineering the cyanobacterial ATP-driven BCT1 bicarbonate transporter for functional targeting to C_3 plant chloroplasts. Journal of Experimental Botany, erae234
2. Förster B, Rourke LM, Weerasooriya HN, **Pabuayon ICM**, Rolland V, Au EK, Bala S, Bajsa-Hirschel J, Kaines S, Kasili R, LaPlace L, Machingura MC, Massey B, Rosati VC, Stuart-Williams H, Badger MR, Price GD, Moroney JV (2023) The *Chlamydomonas reinhardtii* chloroplast envelope protein LCIA transports bicarbonate in planta, Journal of Experimental Botany, 74(12): 3651-3666
3. **Pabuayon ICM**, Pabuayon ILB, Singh RK, Ritchie GL, de los Reyes BG (2022) Applicability of hyperspectral imaging during salinity stress in rice for tracking Na^+ and K^+ levels *in planta*. PLoS One 17(7): e0270931
4. **Pabuayon ICM**, Jiang J, Qian H, Ching J-S, Shi H (2021) Gain-of-function mutations of AtNHX1 suppress sos1 and improve salt tolerance in Arabidopsis. Stress Biology 1(1): 1-19
5. Ukwatta J, **Pabuayon ICM**, Park J, Chen J, Chai X, Zhang H, Zhu JK, Xin Z, Shi H (2021) Comparative physiological and transcriptomic analysis reveals salt tolerance mechanisms in Sorghum bicolor (L.) Moench. Planta 254: 98
6. Sanchez J, Pal Kaur P, **Pabuayon ICM**, Karampudi NBR, Kitazumi A, Sandhu N, Catolos M, Kumar A, De los Reyes BG (2021) *DECUSSATE* network with flowering genes explains the variable effects of *qDTY12.1* to rice yield under

drought across genetic backgrounds. The Plant Genome e20168 [Joint first authorship with Sanchez and Pal Kaur]

7. **Pabuayon ICM**, Kitazumi A, Cushman KR, Singh RK, Gregorio GB, Dhatt BK, Zabet-Moghaddam M, Walia H, De Los Reyes BG (2021) Novel and transgressive salinity tolerance in recombinant inbred lines of rice created by physiological coupling-uncoupling and network rewiring effects. Frontiers in Plant Science 12:615227.
8. **Pabuayon ICM**, Kitazumi A, Gregorio GB, Singh RK, de los Reyes BG (2020) Contributions of adaptive plant architecture to transgressive salt tolerance in recombinant inbred lines of rice: Molecular mechanisms revealed by transcriptional networks. Frontiers in Genetics. 11:594569. doi: 10.3389/fgene.2020.594569
9. Cushman KR, **Pabuayon ICM**, Hinze LL, Sweeney ME, De Los Reyes BG (2020) Networks of physiological adjustments and defenses and their synergy with Na^+ homeostasis explain the hidden variation for salinity tolerance across the cultivated *Gossypium hirsutum* germplasm. Frontiers in Plant Science (Physiology) 11:588854. doi: 10.3389/fpls.2020.588854
10. Kitazumi A, **Pabuayon ICM,** Ohyanagi H, Fujita M, Osti B, Shenton MR, Kakei Y, Nakamura Y, Brar DS, Kurata N, de los Reyes BG (2018) Potential of *Oryza officinalis* to augment the cold tolerance genetic mechanisms of Oryza sativa by network complementation. Scientific Reports. 8: 16346
11. **Pabuayon IM**, Yamamoto N, Trinidad JL, Longkumer T, Raorane ML, Kohli A (2016) Reference genes for accurate gene expression analyses across different tissues, developmental stages and genotypes in rice for drought tolerance. Rice. 9(1):32
12. Dixit S, Biswal AK, Min A, Henry A, Oane RH, Raorane ML, Longkumer T, **Pabuayon IM,** Mutte SK, Varadarajan AR, Miro B, Govindan G, Enriquez, BA, Pueffeld M, Sreenivasulu N, Slamet-Loedin I, Sundarvelpandian K, Tsai YC, Raghuvanshi S, Hsing YC, Kumar A, Kohli A (2015) Action of multiple intra-QTL genes concerted around a co-localized transcription factor underpins a large effect QTL. Scientific Reports. 5:15183
13. Raorane ML, **Pabuayon IM,** Miro B, Kalladan R, Reza-Hazirezai M, Oane RH, Kumar A, Sreenivasulu N, Henry A, Kohli A (2015) Variation in primary metabolites in parental and near-isogenic lines of the QTL *$qDTY_{12.1}$:* altered roots and flag leaves but similar spikelets of rice under drought. Molecular Breeding. 35: 138.
14. Raorane ML, **Pabuayon IM,** Varadarajan AR, Mutte SK, Kumar A, Treumann A, Kohli A (2015) Proteomic insights into the role of the large-effect QTL *qDTY12.1* for rice yield under drought. Molecular Breeding. 35: 139.
15. Raorane ML, Mutte SK, Varadarajan AR, **Pabuayon IM**, Kohli A (2013) Protein SUMOylation and plant abiotic stress signaling: in silico case study of rice RLKs, heat-shock and Ca^{2+}-binding proteins. Plant Cell Reports. 32:1053-1065.

BOOK CHAPTERS

1. Kitazumi A, **Pabuayon ICM**, Cushman KR, Yano K, de los Reyes, BG (2022) Plant transcriptomics: Global approach to understand cellular processes and their regulation in model and non-model plants. In: Plant Omics: Advances in Big

Data Biology (Ohyanagi H, Yano K, Yamamoto E, Kitazumi A Eds.). CAB International. Pp. 10-29.

2. **Pabuayon ICM**, Trinidad JL, Angeles-Shim RB, Kohli A (2020) Systems biology of crop improvement: Drought tolerance as a model to integrate molecular biology, physiology, and breeding. In: *Advancements in Crop Improvement Techniques* (Narendra Tuteja, Renu Tuteja, Nishat Passricha, Shabnam Saifi Eds.). Woodhead Publishing. Pp. 209-232.
3. Trinidad JL, **Pabuayon ICM**, Kohli A (2020) Harnessing protein posttranslational modifications for plant improvement. In: *Advancements in Crop Improvement Techniques* (Narendra Tuteja, Renu Tuteja, Nishat Passricha, Shabnam Saifi Eds.). Woodhead Publishing. Pp. 385-402.
4. de los Reyes BG, Kim YS, Mohanty B, Kumar A, Kitazumi A, **Pabuayon ICM,** Sandhu N, Lee DY (2018) Cold and Water Deficit Regulatory Mechanisms in Rice: Optimizing Stress Tolerance Potential by Pathway Integration and Network Engineering. In: *Rice Genomics, Genetics and Breeding* (Takuji Sasaki, Motoyuki Ashikari Eds.). Springer-Nature Singapore. Pp. 317-359.

ABSTRACTS PRESENTED IN NATIONAL AND INTERNATIONAL MEETINGS

1. Poster: Profiling Na^+ and K^+ accumulation across biparental inbreds of rice by hyperspectral imaging by **Isaiah Pabuayon**, Irish Lorraine Pabuayon, Harkamal Walia, Glen Ritchie, Rakesh Kumar Singh, and Benildo G. de los Reyes. Presented at the Plant and Animal Genome Conference XXVIII, 2020, in San Diego, CA.
2. Poster: Positive and negative complementation effects determine transgressive salt stress tolerance in recombinant inbreds of rice by **Isaiah Pabuayon**, Ai Kitazumi, Harkamal Walia, Rakesh Kumar Singh, Glenn B. Gregorio, and Benildo G. de los Reyes. Presented at the Plant and Animal Genome Conference XXVIII, 2020, in San Diego, CA.
3. Poster: Identification and characterization of genes interacting with transcription factor *DECUSSATE* in rice by Oluwatobi R. Bello, **Isaiah Pabuayon**, Jacobo Sanchez, Pushpinder Pal Kaur, Naga Bhushan Rao Karampudi, Ai Kitazumi, and Benildo G. de los Reyes. Presented at the Plant and Animal Genome Conference XXVIII, 2020, in San Diego, CA.
4. Poster: Physiological networks rather than cellular Na^+ transport and sequestration explain phenotypic variation for salt tolerance potential across cultivated *Gossypium* germplasm by Kevin R. Cushman, **Isaiah Pabuayon**, Lori L. Hinze, Megan Sweeney, Benildo G. de los Reyes. Presented at the Plant and Animal Genome Conference XXVIII, 2020, in San Diego, CA.
5. Poster: Rice decussate mediates yield retention under drought and provides convincing evidence of functional interactions between *qDTY12.1* and the resident genomic background by Jacobo Sanchez, Pushpinder Pal Kaur, Naga Bhushana Rao Karampudi, Ai Kitazumi, **Isaiah Pabuayon**, Nitika Sandhu, Margaret Catolos, Arvind Kumar, and Benildo G. de los Reyes. Presented at the Plant and Animal Genome Conference XXVIII, 2020, in San Diego, CA.
6. Poster: Coupling of growth and defense potentials from genetically diverse parents lead to superior salt tolerance in transgressive segregants of rice: Systems biology evidences supporting genomic selection by **Isaiah Pabuayon**,

Ai Kitazumi, Kevin R. Cushman, Harkamal Walia, RK Singh, Glenn Gregorio, and Benildo de los Reyes. Presented at the Plant and Animal Genome Conference XXVII, 2019, in San Diego, CA.

7. Poster: Regulation of recipient parent's genomic structure via epigenetic patterns from donor parent lead to transgressive segregants in rice by Ai Kitazumi, **Isaiah Pabuayon**, RK Singh, Glenn Gregorio, and Benildo de los Reyes. Presented at the Plant and Animal Genome Conference, XXVII, 2019, in San Diego, CA.
8. Poster: Contribution of Na^+ sequestration and mobilization to observed variation in salinity stress tolerance across the *Gossypium* germplasm diversity panel. Presented by Kevin R. Cushman, Lori L. Hinze, **Isaiah Pabuayon,** Megan Sweeney, and Benildo de los Reyes. Presented in the Plant and Animal Genome Conference, XXVII, 2019, in San Diego, CA.
9. Oral Presentation: Novel adaptive mechanisms for transgressive salinity tolerance revealed through transcriptome analysis of rice recombinant inbred lines from genetically diverse parents by **Isaiah Pabuayon**, Ai Kitazumi, Kevin R. Cushman, RK Singh, Glenn Gregorio, and Benildo de los Reyes. Presented at the Symposium of the Southern Section of the American Society of Plant Biologists, 2018, in New Orleans, LA.
10. Poster: Distinct gene expression signatures leading to transgressive phenotype in *Oryza sativa* L. shows novel avenues for crop improvement by **Isaiah Pabuayon,** Ai Kitazumi, RK Singh, Glenn Gregorio, and Benildo de los Reyes. Presented at the Plant and Animal Genome Conference XXVI, 2018, in San Diego, CA.
11. Poster: Novel transcriptional and physiological profiles in recombinant inbred lines of rice exhibiting transgressive traits for salinity tolerance: preliminary evidence of miRNA-mediated network rewiring by **Isaiah Pabuayon,** Ai Kitazumi, Jake Gendron, Kevin R. Cushman, RK Singh, Glenn Gregorio, and Benildo de los Reyes. Presented at the Plant and Animal Genome Conference XXV, 2017, in San Diego, CA.
12. Poster: Cis-elements involved in Ca^{2+}-mediated cold stress signaling diverged between the AA and CC genomes of the genus *Oryza*: Potential implications of genetic complementation and transgressive segregation by Austin J. Dryer, Ai Kitazumi, **Isaiah M. Pabuayon**, Yusuke Kakei, Nori Kurata, and Benildo de los Reyes. Presented at the Rice Technical Working Group Workshop (RTWG), 2016, in Galveston, TX.
13. Poster: Effect of an amidohydrolase and a kinase on root architecture and drought tolerance by Vishnu Varthini, Lou Serafin Lozada, **Isaiah M. Pabuayon**, Amelia Henry, Ajay Kohli and Toshisangba Longkumer. Presented at the 9th International Symposium of the International Society of Root Research (ISRR 9), 2015, in Canberra, Australia.
14. Poster: *OsSWEET13*, a member of nod/mtn3 protein family may aid in better transport of sugar in drought tolerant upland rice. **Isaiah Pabuayon**, Manish Raorane and Ajay Kohli. Presented at the Federation of Crop Societies of the Philippines, 2015, in Clark, Pampanga, Philippines.
15. Poster: Differential posttranslational modification confers increased yield under drought by **Isaiah Pabuayon,** Manish Raorane and Ajay Kohli. Presented at Interdrought IV, 2013 in Perth, Australia.

16. Poster: Comparative proteomics analysis of a QTL NIL: mechanisms for yield under drought in field-grown rice by Manish L. Raorane, Adithi R. Varadarajan, Sumanth Mutte, **Isaiah Pabuayon**, Angelo Peralta and Ajay Kohli. Presented at AOHUPO 2012 in Beijing, China. Won a Young Scientist Award.
17. Oral Presentation: A proteome-based understanding of the Mechanisms for rice yield under drought by **Isaiah Pabuayon**, Manish L. Raorane, Sumanth K. Mutte, Adithi R. Varadarajan, Arvind Kumar and Ajay Kohli. Presented at the Federation of Crop Science Societies of the Philippines, 2012, in Cagayan de Oro, Philippines.
18. Poster and Oral Presentation: Molecular dissection of the QTL $DTY_{12.1}$ for rice yield under drought stress: Transcription factor *no apical meristem*-mediated lateral root profusion as a functional explanation by Akshaya Biswal (Presentor), Rowena Oane, Aye Min, Manish Raorane, Adithi Varadarajan, Sumanth Kumar Mutte, Blesilda Enriquez, **Isaiah Pabuayon**, Angelo Peralta, Evelyn Mendoza, Arvind Kumar, Inez Slamet-Loedin and Ajay Kohli. Presented at the Crop Sciences Society of the Philippines, 2011, in Puerto Princesa, Palawan, Philippines. Won as Best Paper in Upstream Category.

SYNERGISTIC ACTIVITIES

Grant Writing

- Part of the grant writing team for the USDA-NIFA-AFRI proposal entitled "Physiological and Morphological Novelties for Salinity Tolerance in Rice Created by Transgressive Segregation" (Funded; GRANT13361256; Requested funds: $649,999.00)
- Collaborator in grant proposal written for the Texas Corn Producers Board entitled: "Harnessing the potential of natural genetic diversity in *Zea mays* to maximize water use efficiency and photosynthetic efficiency by creating new plant ideotypes" (Rejected; Requested funds: $150,000)
- Co-PI for grant proposal written for the Texas Corn Producers Board entitled: "Integrating carbon partitioning and metabolomics for improved irrigation management in corn" (Submitted; Requested funds: $36,450)
- Lead PI for grant proposal written for the Texas University Funding (TUF) investment opportunity entitled:
- 2027Biological Infrastructure for Cereal Breeding and Genetic Discovery Towards Climate and Environmental Resilience: *Zea mays* as Model System for the Texas High Plains. (Submitted, internal funding; Requested funds: $556,765)

Experience as a Journal Referee

- Molecular Biology Reports, Rice, The Plant Genome, Plant Genetic Resources, The Crop Journal, International Journal of Molecular Sciences (IJMS), Forests, Photosynthesis Research, Current Plant Biology, Crop Science

EXPERIENCE AS AN EDUCATOR

- Co-instructor for PSS3421 Fundamentals of Genetics (Texas Tech University) – Fall 2023

- PSS 5301, Substitute instructor (Fall 2024, Texas Tech University)
- BIOL 7603 Plant Metabolism (Fall 2022, Guest Lecture, Department of Biological Sciences, Louisiana State University, Baton Rouge, LA*)* – Presentation on “A transcriptional regulator that boosts grain yields and shortens the growth duration of rice” by Wei et al.
- PSS 3322, Grain, Fiber, and Oilseed Crops (Spring 2025, Guest Lecture, Texas Tech University) – Rice Biology and Genetics