Jomar Fajardo Rabajante

Professor 2
One UP Professorial Chair for Teaching and Research (2019 – 2021)
Institute of Mathematical Sciences and Physics,
University of the Philippines Los Baños, College, Laguna, 4031 Philippines

OIC-Dean (01 November 2020 – present)
UPLB Graduate School

Affiliate Faculty Member
Faculty of Education, University of the Philippines Open University

Junior Associate (2019 – 2024)
Quantitative Life Sciences group
Abdus Salam International Centre for Theoretical Physics, Trieste, Italy

Member-at-large
National Research Council of the Philippines (NRCP) Governing Board

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Research interest: Mathematical modeling of complex biological and social systems

Biosketch:

Dr. Jomar Fajardo Rabajante is a faculty member of the Institute of Mathematical Sciences and Physics, UPLB since 2008. Prior to his career in UPLB, he worked at the Insular Life Assurance Co., Ltd. as part of its Corporate Planning Staff. Currently, he is the OIC-Dean of the Graduate School of UPLB from 01 November 2020. He also holds an appointment as Junior Associate at the Quantitative Life Sciences Group of the Abdus Salam International Centre for Theoretical Physics in Trieste Italy from year 2019 to 2024. He served as a research collaborator/consultant to the Asian Development Bank, United Nations Population Fund, Zuellig Family Foundation, World Vision, PhilRice, and Province of Bataan in modeling the dynamics of infectious diseases. As part of his advocacy in promoting quantitative sciences to the Filipino community, he created education modules for DOST-SEI STEM activities, and was interviewed by various news agencies. He is a reviewer of several international and local journals and grants, and he is one of the young mathematicians in the Philippines with a two-digit H-index.

Dr. Rabajante obtained his Doctor of Science degree from Shizuoka University Japan as a Japanese Government Monbukagakusho scholar, and M.Sc. in Applied Mathematics degree from the University of the Philippines Diliman as a DOST scholar. He completed a Higher Education Teaching Certificate from the Derek Bok Center for Teaching and Learning in Harvard University, and holds a Professional Certificate in Online Education from the University of Wisconsin-Madison. He was a Visiting Professor at the Biology Department of Carleton University in Canada, Visiting Researcher at the Max Planck Institute for Evolutionary Biology in Germany, and Visiting Scientist at the Fields Institute for Research in Mathematical Sciences in Canada. He attended research schools on mathematical epidemiology at

the Department of Infectious Disease Epidemiology in St. Mary's Hospital, Imperial College London, and on systems biology at Ohio State University.

Dr. Rabajante is one of the proponents and the co-chair for program implementation of the first and only PhD Applied Mathematics degree program in the Philippines. He is instrumental in the revision of the MS Mathematics program of UPLB to include a track in Applied Mathematics. Some of his administrative positions held in the UP System include: (i) OIC-Dean of the UPLB Graduate School; (ii) Program Chair of the Diploma in Mathematics Teaching program and a member of the Executive Committee of the Faculty of Education, UPOU; (iii) Head of the Mathematics Division, IMSP, UPLB; (iv) Chair of the UPLB Graduate School Committee on Physical Sciences, and a member of the GAAC; (v) IMSP Coordinator for Research and Extension; and (vi) founder and coordinator of the UPLB Biomathematics Team which won the 2019 CAS Outstanding Research Team. He is also a fellow of the UP Resilience Institute, and a lead researcher of the UP COVID-19 Pandemic Response Team. Dr. Rabajante is currently a member at large of the National Research Council of the Philippines (NRCP) Governing Board.

Academic degrees and professional development:

- Doctor of Science [Mathematical and Systems Engineering], 2016
  Department of Environment and Energy Systems, Graduate School of Science and Technology, Shizuoka University (National University), Hamamatsu City, Shizuoka, Japan
  Scholarship funded by the Japanese Government (Monbukagakusho: MEXT)
  Supervisor: Prof. Jin Yoshimura (Yoshimura Lab, Faculty of Engineering, Shizuoka Univ.)
  Dr. Sc. Dissertation: "Red Queen dynamics in multi-host and multi-parasite coevolution"
  in collaboration with Prof. Dieter Ebert (Zoological Institute, University of Basel, Switzerland)

- Master of Science in Applied Mathematics [Math in Life & Physical Sciences], 2012
  Institute of Mathematics, College of Science, University of the Philippines Diliman, Quezon City, Philippines
  Scholarship funded by the Department of Science and Technology (DOST)
  M. Sc. Thesis advisers: Prof. Cherryl O. Talaue (UP Diliman) and
  Dr. Baltazar D. Aguda (National Cancer Institute, NIH, USA)
  M. Sc. Thesis: "Mathematical strategies for programming biological cells"

- Earned 12 units including all core courses in Master of Management [Business Management]
  Academic Year 2007-2008; University of the Philippines Manila, Philippines

- Higher Education Teaching Certificate (Premier Certificate), Class 2020
  The Derek Bok Center for Teaching and Learning, Harvard University, USA.

- Professional Certificate in Online Education [Instruction], 2014
  Division of Continuing Studies, University of Wisconsin-Madison, USA
  Focus: Teaching using hybrid/blended learning

- Bachelor of Science in Applied Mathematics [Operations Research], 2006
  Mathematics Division, Institute of Mathematical Sciences and Physics,
  College of Arts and Sciences, University of the Philippines Los Baños, Laguna, Philippines

Special Problem adviser: Prof. Genaro A. Cuaresma
Undergraduate research: "Optimal deployment of community police force"
Practicum: Climate Unit, International Rice Research Institute (IRRI)

- Epidemiology and Control of Infectious Diseases [Mathematical Modelling], 2016
  Department of Infectious Disease Epidemiology, St. Mary's Hospital Campus
  (50 CPD points approved by the Royal College of Physicians)
  Imperial College London, UK

- Social Entrepreneurship, 2015
  Online and Distance Learning (10 CATS credits)
  Department of Continuing Education, University of Oxford, UK

- High School: Don Bosco High School, Sta. Cruz, Laguna (salutatorian)

- Elementary: Immaculate Conception Catholic School, Sta. Cruz, Laguna

Postdoctoral fellowships and Academic visits:

- Junior Associate, from January 2019 to December 2024
  The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy
  Scientific coordinator: Dr. Matteo Marsili (Quantitative Life Sciences research group)

- Visiting Scholar, 2018
  Research Group on Theoretical Models of Eco-evolutionary Dynamics, Department of Evolutionary Theory, Max Planck Institute for Evolutionary Biology, Plön, Germany
  Hosted by Dr. Chaitanya Gokhale

- Short Term Visitor, 2018
  The Fields Institute for Research in Mathematical Sciences at the University of Toronto (under the Thematic Program on Emerging Challenges in Mathematical Biology)

- Visiting Lecturer, 2017
  Department of Mathematical and Systems Engineering, Shizuoka University (National University), Hamamatsu City, Shizuoka, Japan
  Hosted by Prof. Jin Yoshimura

- Visiting Professor, 2017
  Department of Biology, Carleton University (Canada's Capital University), Ottawa, Ontario, Canada
  Hosted by Prof. Mark R. Forbes
  Funded by UP System for Postdoctoral Training

Selected International Publications:

[21] Raitzer D.A., Lavado R.F., Rabajante J.F., et al. 2020. Cost–benefit analysis of face-to-face closure of schools to control COVID-19 in the Philippines. *ADB Briefs*. DOI: 10.22617/BRF200405-2. https://www.adb.org/publications/cost-benefit-analysis-closure-schools-covid-19-philippines

[20] Buhat C.A.H., Duero J.C.C., Felix E.F.O., Rabajante J.F. and Mamplata J.B. 2020. Optimal allocation of COVID-19 test kits among accredited testing centers in the Philippines. *Journal of Healthcare Informatics Research*. doi: 10.1007/s41666-020-00081-5.
Publisher: Springer

[19] Buhat C.A.H., Rabajante J.F. and Paller V.G.V. 2020. Spatiotemporal modeling of parasite aggregation among fish hosts in a lentic ecosystem. *Modeling Earth Systems and Environment*. https://doi.org/10.1007/s40808-020-00983-8.
Publisher: Springer

[18] Dy L.F. and Rabajante J.F. 2020. A COVID-19 infection risk model for frontline health care workers. *Network Modeling Analysis in Health Informatics and Bioinformatics*, 9: 57.
Publisher: Springer

[17] Rabajante J.F. 2020. Insights from early mathematical models of 2019-nCoV Acute Respiratory Disease (COVID-19) Dynamics. *Journal of Environmental Science and Management*, 23-1: 1-12.
Publisher: UPLB

[16] Rabajante J.F., Tubay J.M., Jose E.C. and Cervancia C.R. 2019. Pollinator diversity and density measures: survey and indexing standard to model, detect, and assess pollinator deficits. *Modeling Earth Systems and Environment*, online.
DOI: 10.1007/s40808-019-00684-x
Publisher: Springer Nature

[15] Verano K.V.B. and Rabajante J.F. 2019. Sustainability of nonlinear consumption schemes in resource dynamics with Allee and crowding effects. *Sustainable Production and Consumption*, 20: 192-206.
DOI: 10.1016/j.spc.2019.06.006.
Publisher: Elsevier

[14] Rabajante J.F. and del Rosario R.CH. 2019. Modeling long ncRNA-mediated regulation in the mammalian cell cycle. Chapter 17 in *Computational Biology of Non-Coding RNA: Methods and Protocols* (Methods in Molecular Biology vol. 1912), pp. 427-445.
DOI: 10.1007/978-1-4939-8982-9_17.
Publisher: Humana Press (Springer Nature)
Editors: Xin Lai (University of Erlangen-Nuremberg and University Hospital of Erlangen), Shailendra K. Gupta (University of Rostock) and Julio Vera (University of Erlangen-Nuremberg and University Hospital of Erlangen)

[13] Anzia E.L. and Rabajante J.F. (corresponding author). 2018. Antibiotic-driven escape of host in a parasite-induced Red Queen dynamics. *Royal Society Open Science*, 180693.
DOI: 10.1098/rsos.180693.
Publisher: The Royal Society Publishing

[12] Gavina M.K.A., Aoki K., Rabajante J.F. et al. 2018. Long-term persistence of agricultural pest insects by risk-spreading dispersal. *Ecological Research*, online.
DOI: 10.1007/s11284-018-1615-z.
Publisher: Springer

[11] Tahara T., Gavina M.K.A., Rabajante J.F. et al. 2018. Asymptotic stability of a modified Lotka-Volterra model with small immigrations. *Scientific Reports*, 8: 7029.
DOI: 10.1038/s41598-018-25436-2.
Publisher: Nature Publishing Group

[10] Buhat C.A.H., Talabis D.A.S.J., Cueno A.L., Gavina M.K.A., Babierra A.L., Cuaresma G.A. and Rabajante J.F. (corresponding author) 2017. Stochasticity in the parasite-driven trait evolution of competing species masks the distinctive consequences of distance metrics. *Processes*, 5(4): 74.
DOI: 10.3390/pr5040074.
Publisher: MDPI
Invited Paper

[9] Cortez M.J.V., Rabajante J.F. (corresponding author), Tubay J.M. and Babierra A.L. 2017. From epigenetic landscape to phenotypic fitness landscape: Evolutionary effect of pathogens on host traits. *Infection, Genetics and Evolution*: Journal of Molecular Epidemiology and Evolutionary Genetics of Infectious Diseases (MEEGID), 51: 245-254.
DOI: 10.1016/j.meegid.2017.04.006.
Publisher: Elsevier

[8] Rabajante J.F., Tubay J.M., Ito H., Uehara T., Kakishima S., Morita S., Yoshimura J. and Ebert D. 2016. Host-parasite Red Queen dynamics with phase-locked rare genotypes. *Science Advances*, 2(3): e1501548.
DOI: 10.1126/sciadv.1501548.
Publisher: American Association for the Advancement of Science (AAAS)
http://advances.sciencemag.org/content/2/3/e1501548

[7] Jatulan E.O., Rabajante J.F., Banaay C.G.B., Fajardo A.C. Jr. and Jose E.C. 2015. A mathematical model of intra-colony spread of American Foulbrood in European honeybees (*Apis mellifera* L.). *PLoS ONE*, 10(12): e0143805.
DOI: 10.1371/journal.pone.0143805.
Publisher: Public Library of Science

[6] Tubay J.M., Suzuki K., Uehara T., Kakishima S., Ito H., Ishida A., Yoshida K., Mori S., Rabajante J.F., Morita S., Yokozawa M. and Yoshimura J. 2015. Microhabitat locality allows multi-species coexistence in terrestrial plant communities. *Scientific Reports*, 5: 15376.
DOI: 10.1038/srep15376.
Publisher: Nature Publishing Group
http://www.nature.com/articles/srep15376

[5] Rabajante J.F., Tubay J.M., Uehara T., Morita S., Ebert D. and Yoshimura J. 2015. Red Queen dynamics in multi-host and multi-parasite interaction system. *Scientific Reports*, 5: 10004.
DOI: 10.1038/srep10004.

Publisher: Nature Publishing Group
http://www.nature.com/articles/srep10004

[4] Rabajante J.F. and Talaue C.O. 2015. Equilibrium switching and mathematical properties of nonlinear interaction networks with concurrent antagonism and self-stimulation. *Chaos, Solitons & Fractals*: The interdisciplinary journal of Nonlinear Science, and Nonequilibrium and Complex Phenomena, 73: 166-182.
DOI: 10.1016/j.chaos.2015.01.018.
Publisher: Elsevier

[3] Rabajante J.F. and Babierra A.L. 2015. Branching and oscillations in the epigenetic landscape of cell-fate determination. *Progress in Biophysics & Molecular Biology*, 117: 240-249.
DOI: 10.1016/j.pbiomolbio.2015.01.006.
Publisher: Elsevier

[2] Gavina M.K.A., Rabajante J.F. (corresponding author) and Cervancia C.R. 2014. Mathematical programming models for determining the optimal location of beehives. *Bulletin of Mathematical Biology*, 76(5): 997-1016.
DOI: 10.1007/s11538-014-9943-9.
Publisher: Springer

[1] Tambaoan R.S., Rabajante J.F., Esteves R.J.P. and Villadelrey M.C. 2011. Prediction of migration path of a colony of bounded-rational species foraging on patchily distributed resources. *Advanced Studies in Biology*, 3(7): 333-345.

Publication in other journals:

[11] Rabajante J.F. et al. 2019. Birthing a mathematical biology community in the Philippines. *Philippine Science Letters*, 12: 102-104.

[10] Cueno A.L., Gavina M.K.A. and Rabajante J.F. 2017. Oscillation propagation in a two-dimensional lattice of mutually repressive nodes. *Manila Journal of Science*, 10: 1-15.
Publisher: De La Salle University – Manila

[9] Rabajante J.F. and Gavina M.K.A. 2015. Producing oscillatory decisions. *Neuroscience Communications*, 2: e859.
DOI: 10.14800/nc.859.

[8] Rabajante J.F., Babierra A.L., Tubay J.M. and Jose E.C. 2015. Mathematical modeling of cell-fate specification: from simple to complex epigenetics. *Stem Cell Epigenetics*, 2: e752.
DOI: 10.14800/sce.752.

[7] Talabis D.A.SJ., Manay E.J.V, Babierra A.L., Flores J.J.M and Rabajante J.F. 2013. A Numerical Model of Philippine Population Growth: Child Policy, Quantitative Insights and Challenges. *International Journal of Social Sciences*, 8: 45-71.
DOI: 10.7718/ijss.v8i1.667.

[6] Bosaing A.A.D., Rabajante J.F. and De Lara M.L.D. 2012. Assignment Problems with Weighted and Nonweighted Neighborhood Constraints in 3^6, 4^4 and 6^3 Tilings. *Southeast Asian Journal of Sciences*, 1(1): 55-75.

[5] Rabajante J.F. 2012. Investigating the Propagation and Death of Information in Human Subpopulation Networks. *International Journal of Applied Mathematical Research*, 1(4): 433-451. DOI: 10.14419/ijamr.v1i4.336.

[4] Umali R.E.DC. and Rabajante J.F. 2011. A Mathematical Model of Rumor Propagation for Disaster Management. *Journal of Nature Studies*, 10(2): 61-70.

[3] Castilan M.G.D., Naanod G.R.K., Otsuka Y.T. and Rabajante J.F. 2011. From Numbers to Nature. *Journal of Nature Studies*, 9(2)/10(1): 35-39.

[2] Esteves R.J.P., Villadelrey M.C. and Rabajante J.F. 2010. Determining the optimal distribution of bee colony locations to avoid overpopulation using mixed integer programming. *Journal of Nature Studies*, 9(1): 79-82.

[1] Rabajante J.F., Figueroa R.B. Jr. and Jacildo A.J. 2009. Modeling the area restrict searching strategy of stingless bees, *Trigona biroi*, as a quasi-random walk process. *Journal of Nature Studies*, 8(2): 15-21.

Software and decision tools created:

COVID-19 Job Risk Calculator, Workplace Outbreak Microsimulator, Event R Calculator. Link: https://datastudio.google.com/s/n2gb16MnV6w

COVID-19 Dashboard. Link: https://datastudio.google.com/s/pzmhC3cnqWc

COVID-19 Projections. Link: https://endcov.ph/projections

Narciso M.P., Gapac G.L.F., Reyes J.M., del Rosario R.CH., Lao A.R., Nacario R.C., Lebrilla C.B., Completo G.C.J., Heralde F.M.III, Padolina I.D., Rabajante J.F. 2019. GlycoLINC Network Toolbox. University of the Philippines Los Baños, Philippines.
Link: https://glincnt.weebly.com
<ongoing Copyright application>

Pig and Carabao Body Weight Estimator (BOWES) using Android Cellphone (date of copyright registration: March 1, 2019).

International exams:

LOMA 280 Principles of Insurance: Life, Health and Annuities (May 14, 2007)

LOMA 290 Insurance Operations (November 6, 2007)

LOMA 356 Principles of Investments and Institutional Investing (May 12, 2008)

[Certificate of Completion, Level One: Life Office Management Association (LOMA),
Life Management Institute Track]

Awards and funding grants:

2 UP System Enhanced Creative Work and Research Grants

UP System grant for COVID-19 modeling and data analytics (under the UP Resilience Institute)

International Foundation for Science (IFS) collaborative research grant (where the Team AQUASafe is bestowed with Professor Carolina MacGillavry Collaborative Research Award via the Royal Netherlands Academy of Arts and Sciences for being a top ranked application to IFS)

Glycoproteomics of Filipino Lung Cancer Cell Lines for Biomarker Discovery and Anti-Cancer Screening of Natural Products (co-project leader, and supervisor of the *in silico* team)
Institute for Health Innovation and Translational Medicine, Philippine-California Advanced Research Institutes (PCARI)

Junior Associateship Scheme, The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy

One UP Professorial Chair for Teaching and Research (2019 – 2021)

UP Scientific Productivity System Award (UP Scientist 1 from 2017-2019, submitted application for promotion to UP Scientist 3)

2019 ASEAN Science Diplomat

2nd Prize Winner, 2016 Talent Search for Young Scientists
National Academy of Science and Technology (NAST)

2012 UPLB Outstanding Mathematics Instructor

Dean's Award, Graduate School of Science and Technology, Shizuoka University

President Gloria Macapagal-Arroyo Leadership Award

Philippine Society for the Study of Nature best research paper

Jury's Choice Poster award, Hands-on Research in Complex Systems School, ICTP Italy

Nominee, The Outstanding Young Men, JCI Philippines

Work experience:

- Faculty Member, Mathematics Division, Institute of Mathematical Sciences and Physics (IMSP), College of Arts and Sciences, University of the Philippines Los Baños (UPLB) [since 2008]
- Affiliate Faculty Member and Program Chair of the Diploma in Mathematics Teaching program, Faculty of Education, University of the Philippines Open University
- OIC-Dean, UPLB Graduate School [01 November 2020 – present]
- Head of the Mathematics Division, Institute of Mathematical Sciences and Physics (IMSP), College of Arts and Sciences, University of the Philippines Los Baños (UPLB) [2017]
- Chair, UPLB Graduate School Committee on Physical Sciences [2017 – 2020]
- IMSP Coordinator for Research and Extension [2012 – 2013]
- UPLB Bee Program Research Staff [2009 – present]
- Corporate Planning Staff, Office of the Chairman of the Board and Chief Executive Officer, The Insular Life Assurance Company, Ltd. [2006 – 2008]
- Professional Service and Student Trainee, Climate Unit, Crop and Environmental Sciences Division, International Rice Research Institute (IRRI) [2005 and 2008]
- Project staff/Consultant of several funded research projects

Visit the following website for more details: www.jomarrabajante.site123.me