# Ruth Kristianingsih *30th November, 1992*

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## EDUCATION

### University of East Anglia — NORWICH, UK
**Rotation PhD Programme in Plant and Microbial Sciences** *October 2020 – Present*

Four-year multi-disciplinary rotation PhD programme at the John Innes Centre and The Sainsbury Laboratory in genetics, genomics, cell biology, microbiology, molecular biology, crop science, biological chemistry, applied mathematics, computational and systems biology.

### Joint MSc MathMods – Mathematical Modeling in Engineering — mathmods.eu

**Universitat Autònoma de Barcelona** *September 2017 – September 2018*

- **Fourth Semester**: In this semester I did my Master's Thesis.
- **Third Semester**: This semester is focused on how to model real systems in which randomness plays a significant role, and how to deal with situations in which a best alternative is sought among many feasible possibilities. The courses conducted are Optimization (Combinatorial), Data Visualization & Modeling, Applied Stochastic Processes, Logistic Systems, and Workshop in Mathematical Modeling.

**Universität Hamburg** *March 2017 – September 2017*

- **Second Semester**: The second semester is designed to provide the student with advanced skills in both the design of fast and efficient numerical schemes and their implementations. Several courses conducted are Numerical Methods for PDE, Galerkin Methods, Fluid Dynamics, and Optimization.

**Università degli Studi dell'Aquila** *September 2016 – February 2017*

- **First Semester**: This semester is focused on the Mathematical Theory as the foundation of mathematical modeling, such as Functional Analysis, Applied Partial Differential Equations, Dynamical Systems, and Control Systems.

### Satya Wacana Christian University — SALATIGA, INDONESIA
**Bachelor of Science in Mathematics (Cumlaude)** *August 2010 – February 2014*

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## RESEARCH EXPERIENCE

### The Sainsbury Laboratory — tsl.ac.uk
**Bioinformatics Predoctoral Researcher** *November 2018 – July 2020*

I developed Deep Learning models (Fully Connected Dense, Convolutional, Recurrent-LSTM, and/or combination among these architectures) using protein sequence data to solve two different problems: determining protein sub-cellular location, and predicting effector protein. Throughout these projects I have done:

- Data mining, processing, and analysis.
- Statistical modeling with classical machine learning techniques.
- Sequence data retrieval from UniProt/SwissProt and GenBank/Ensembl.
- Statistical analyses to benchmark the effectiveness of the models.
- Hyper-parameter tuning to get a model with the best accuracy score.
- Managing jobs in HPC clusters.
- Developed R packages with some recurrent functions I used throughout my research.

Centre de Recerca Matemàtica                                                                crm.cat
**Computational and Mathematical Biology Intern**            *April 2018 – August 2018*
During this internship, I completed my Master's Thesis in constructing ODEs models for the dynamics of multipartite viruses inside a cell host and within a host, as well as conducting a stochastics simulation, for instance using Gillespie's algorithm.

Universität Hamburg                                                                uni-hamburg.de
**Modeling Camp Week**                                                                *June 2017*
During the second week of June 2017, I joined a modeling camp at Universität Hamburg. In this seminar, I worked with my team to solve real world problems by constructing a mathematical model in biology. Our project was Mathematical Modeling of Aqueous Humor.

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WORK EXPERIENCE

IDX Partners                                                                idxpartners.com
**Data Scientist**                                                                *August 2015 – August 2016*
I had tasks to construct statistical and mathematical models using SPSS, SAS, and R, then presented the results to clients. Beside that, some of my tasks included:
- Data exploration from multiple disparate sources.
- Business intelligence reporting.
- Experimental design.
- Data mining with SQL.

State Electricity Company (PLN Indonesia)                                pln.co.id
**Internship in Human Resource and Logistics Department**            *April 2013 – May 2013*
- Made contract agreement letters between State Electricity Company and vendors.
- Checked goods which were supplied by vendors.
- Calculated the inventory and estimate inventory reordering using Operational Research: inventory model (stock control).
- Ran SAP (System Application and Product In Data Processing) to manage employees' administration and work time.

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TEACHING EXPERIENCE

Pro Education Bali                                                                proed.asia
**Mathematics Teacher**                                                                *December 2014 – June 2015*
I taught mathematics and science to international students ranging from Elementary School to Senior High School with several different curricula who mostly had learning disabilities.
- Gave them exercises and exams and discuss the exercises.
- Met parents to discuss about their children's progress.

Science and Mathematics Faculty, SWCU                                sainsmat.uksw.edu
**Senior High School Mathematics Olympiad Preparation's Tutor**    *May 2014 – June 2014*
- Helped the students with Number Theory, Combinatorics, and Geometry.
- Gave the students exercises.
- Discussed the exercises.

Science and Mathematics Faculty, SWCU                                sainsmat.uksw.edu
**Teaching Assistant**                                                                *January 2014 – May 2014*
Taught Mathematical Modeling and Numerical Methods to Mathematics Department students.
- Taught and gave tutorials about how to use MATLAB.

- Made and marked assignments and final exams.
  - Calculated students' final grades.

### Health Faculty, SWCU
**Teaching Assistant**

uksw.edu/fik
*August 2013 – December 2013*

Taught Nursing and Pharmacology Math to Health Faculty students.
  - Made and marked assignments and final exams.
  - Calculated students' final grades.

### Independent Worker
**Mathematics Private Tutor**

*May 2012 – December 2014*

  - Prepared the material.
  - Taught elementary school students to university students about the material.
  - Gave them exercises and exams.

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PROFESSIONAL DEVELOPMENT

### Earlham Institute
**Artificial Intelligence Workshop**

earlham.ac.uk
*January 2019*

### Coursera
**Deep Learning Specialization**

coursera.org
*2019*

### Centre de Recerca Matemàtica
**Advanced Course: School on Mathematical Modeling of Tumor Growth and Therapy**

crm.cat

*April 3, 2018 – April 6, 2018*

In this course, I learn about the recent progress in the field of mathematical modeling applied to tumor growth and oncology, particularly focused in the emergence of new modeling and analytical multi-scale techniques.

### Satya Wacana Christian University
**The IX Science and Science Teaching National Seminar**

uksw.edu
*June 21, 2014*

Progress of Science and Technology and the Implementation of the 2013 Curriculum.

### PGRI Ronggolawe University
**The Mathematics and Mathematics Teaching National Seminar**

unirow.ac.id
*May 24, 2014*

Presentation Research to be published.

### Yogyakarta National University
**The Mathematics and Mathematics Teaching National Seminar**

english.uny.ac.id
*November 9, 2013*

Presentation Research to be published.

### Satya Wacana Christian University
**The VIII Science and Science Teaching National Seminar**

uksw.edu
*June 15, 2013*

Learning Science which is interesting and challenging.

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PUBLICATIONS

  - R. Kristianingsih and D. MacLean (2020). Accurate plant pathogen effector protein classification ab initio with deepredeff, an ensemble of convolutional neural networks. *BioRxiv*, 2020.07.08.193250. DOI: `https://doi.org/10.1101/2020.07.08.193250`

  - R. Kristianingsih, H. A. Parhusip and T. Mahatma (2013). Penggunaan Algoritma Genetik dalam Mengoptimalkan Kandungan Karbohidrat dan Protein pada Mocorin. (Indonesian) [Using a Genetic Algorithm in Optimizing the Carbohydrate and Protein Content of Mocorin]. *Proceedings of the National Mathematics Seminar and Mathematics Education* 4(1):207–214, Yogyakarta, Indonesia, 2013. ISBN: 978-979-16353-9-4.

- R. Kristianingsih, H. A. Parhusip and T. Mahatma. Pencarian Proporsi Penambahan Bekatul pada Mocorin Yang Baik Dikonsumsi oleh Penderita Kolesterol dengan Menggunakan Algoritma Genetik Multiobjective Function. (Indonesian) [Searching the Proportion of Bran's Addition in Mocorin Which is Good to be Consumed by People with High Cholesterol Using a Multi-Objective Genetics Algorithm]. *Proceedings of the National Mathematics Seminar and Mathematics Education*, 5(1):411–417, Tuban, Indonesia, 2014. ISBN: 978-602-70609-0-6.

## Scholarships and Awards

- Full Erasmus Mundus Scholarship. Education, Audiovisual and Culture Executive Agency (EACEA). 2016–2018. Scholarship for two years MSc (MathMods). Amount: 48,000 €.

- Scholarship in Undergraduate Studies. International Christian Scholarship Foundation (ICSF). 2010–2014.

## Computer Skills

**Programming:** R, Python, MATLAB, C, Git, Bash.

**Machine Learning:** TensorFlow, Keras, Scikit-learn.

**Data Analysis and Visualization:** R, ggplot2, dplyr.

**Bioinformatics:** BLAST, NCBI Entrez, SignalP, Biomart.

**Data Mining:** SQL, IBM SPSS Modeler & Statistics, IBM Infosphere Information Analyzer.

**Others:** IBM Cognos Analytics, macOS, LaTeX, HPC clusters.

## Other Information

**Languages:** Indonesian (*mother tongue*), Javanese (*mother tongue*), English (*professional working proficiency*), Italian (*basic*), and German (*basic*).

**Interests:** watercolor painting, cooking, history, psychology, volunteering, doing community service, and traveling.

## References

**Prof. Dan MacLean**                                   dan.maclean@tsl.ac.uk
Head of Bioinformatics
Bioinformatics Group, The Sainsbury Laboratory

**Prof. Aureli Alabert**                                aureli.alabert@uab.cat
Professor of Statistics and Operations Research
Faculty of Sciences, Autonomous University of Barcelona

**Prof. Tomás Alarcón**                                 talarcon@crm.cat
Deputy Director – ICREA
Computational & Mathematical Biology, Centre de Recerca Matemàtica

**Prof. Josep Sardanyés**                               jsardanyes@crm.cat
Senior research fellow laCaixa
Computational & Mathematical Biology, Centre de Recerca Matemàtica