Daniel Nelson

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Profile

A bioinformatics graduate with plenty of international working experience, a good understanding of genomics and molecular biology, proficient in programming, and interested in artificial intelligence applications. Currently seeking an internship position to gain more experience and skills to ultimately be part of the integral efforts in tackling genomics-related diseases.

Education

Indonesia International Institute for Life-Sciences (i3L) - **Jakarta, Indonesia**   Sep 2020 - Aug 2024

- Bachelor of Science in Bioinformatics, cGPA: 3.86/4.00 (cum laude).
- Award: The well-rounded graduate of the Bioinformatics study program.
- Thesis: "Lineage Tree: Visualization Platform for Exploring SARS-CoV-2 Pango Lineage Networks and Lineage-Defining Mutations".
  Skills used: Python, Linux, Vim, data exploration and preprocessing (Pandas, NumPy), automatic pipeline creation (utility function scripts, dictionaries/hash objects, crontab), basic website development and API (React.js, Next.js, Tailwind CSS, sqlite3). Please see "Research Experience" under "SIPGA Awardee" for more details.

Research Experience

Bioinformatics Research Intern – **Taoyuan, Taiwan**   Sep - Nov 2024 (onsite); Dec - Feb 2025 (expected, online)

Host lab: Biological Mass Spectrometry & Translational Proteomic/Metabolomic Laboratory

Internship program: International Internship Pilot Program (IIPP) and Letter of Acceptance

- Integration analysis of metabolomics and proteomics datasets coming from renal cell carcinoma (RCC) patients to interpret the unidentified metabolites' biological function through statistical and AI (beta-TCVAE) approaches.
- Programmatically performed pathway enrichment analysis using the hypergeometric test for each unidentified metabolite.

Singapore International Pre-Graduate Award (SIPGA) Awardee – **Singapore**   Nov - Des 2023 (onsite); Jan - Jul 2024 (online)

Host lab: Protein Sequence Analysis, A*STAR Bioinformatics Institute (BII)

Internship program: Singapore International Pre-Graduate Award (SIPGA) and Letter of Acceptance

- Created an interactive website to explore and visualize ~4,000 SARS-CoV-2 Pango-lineage networks to assist public health surveillance and potential vaccine design as a solution to the manually drawn charts by researchers.
- Designed an automatic pipeline that downloads and systematically assigns lineage-defining mutations for the newly designated Pango-lineage virus strains daily.
- Developed visualizations for the major and all lineages, as well as features to search for lineages and their specific mutations that would assist researchers in querying their lineage of interest.

Vienna BioCenter Summer School Student – **Vienna, Austria**   Jul - Aug 2023 (onsite); Sep - Oct 2023 (online)

Project title: "DistanceNet: Inferring Evolutionary Distances Using a Neural Network".

Host lab: Center for Integrative Bioinformatics Vienna (CIBIV), Max Perutz Labs, University of Vienna

Internship program: Vienna BioCenter Summer School Program and Letter of Participation

- Searched for the optimal hyperparameters of feed-forward and graph neural networks to estimate the evolutionary distance of taxa within a phylogenetic tree that could keep up with the tedious distance computation of nucleotide substitution models.
- Optimize the best-performing neural network's distance estimation by trying out a different activation function (sigmoid), filtering extremely small distances from the training data, and shifting a bit of the training dataset into the validation dataset.
- Tested the generalizability of the best network to different types of taxa, sequence lengths, and alignments of Jukes-Cantor 1969 and Felsenstein 1981.

Publications

Nelson, D., Fisranda, F., & Parikesit, A.A. (2023). *In silico* targeting CYP51 of *Naegleria fowleri* using bioactive compounds from Indonesian plants. *Journal of Pharmacy Pharmacognosy Research, 11*(5): 841–862. https://doi.org/10.56499/jppres23.1693_11.5.841

Achievements, Skills, and Certifications

- **Achievement**: Gold Medalist of the Bioinformatics & Synthetic Biology 2022 competition by Synbio Indonesia (certificate). Led the

team to do a virtual screening of drugs to address the leprosy drug resistance problem in Papua, Indonesia.

- **Interest**: artificial intelligence, genomics data science, algorithm design, pipeline development, multi-omics data analysis, *in silico* drug discovery (structural bioinformatics).
- **Programming Languages**: Python, R, MySQL, Bash scripting (basic), Java (basic), Javascript (basic).
- **Bioinformatics Tools/Softwares**: AliView, Discovery Studio, Open Babel, PyMOL, PyRx, YASARA, Git and GitHub.
- **Certifications**: R Programming ([online coursework issued by Coursera](#)), Scientific Computing with Python ([online coursework issued by freeCodeCamp](#)), SQL (Basic) ([certification test issued by HackerRank](#))

Language

- Indonesian and English ([CEFR Level Test, Overall Level: B2+](#))

Organizational Experience

Python tutor at i3L Programming & Robotics Club - Jakarta, Indonesia   Aug 2022 - Jan 2023
- Instructed basic Python programming for 20+ other life science students without coding experience.

Head of i3L Christian Community and PIC of Event Division - Jakarta, Indonesia   Aug 2021 - Sep 2022
- Led and managed overall activities and planned the programs for 40+ community members.

i3L Science Tutor Program (STP) - Jakarta, Indonesia   Nov 2021 - Jun 2022
- Taught elementary science lessons to kids from Yayasan Tangan Pengharapan (YTP) and Kampung Guji (HORE).

Projects

- Bioinformatics Flashcard / Quiz App (https://github.com/DanielSoenarto/bioinformatics-flashcard)
- Bioturtle – fasta file GC content calculator (https://github.com/DanielSoenarto/bioturtle)

References

- **Prof. Dr. rer. nat. Arli aditya Parikesit**
  Vice Rector II Director of Research and Industry Collaboration i3L, Indonesia
  Relationship: Lecturer in Macromolecular Modeling & Visualization and academic research supervisor
  Email will be provided upon request

- **Muammar Sadrawi, B.S., M.S., Ph.D.**
  Head of Study Program of Bioinformatics i3L, Indonesia
  Relationship: Lecturer in Artificial Intelligence in Life Science and research internship supervisor
  Email will be provided upon request

- **Univ.-Prof. Dr. Arndt von Haeseler**
  Ex Group Leader at Center for Integrative Bioinformatics Vienna (CIBIV)
  Relationship: Principal Investigator during VBC Summer School 2023
  Email will be provided upon request

- **Mr. Raphael Lee Tze Chuen**
  Research Manager at A*STAR Bioinformatics Institute (BII)
  Relationship: Research supervisor during SIPGA internship
  Email will be provided upon request