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Anamaria Elek

Computational Biologist

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Summary

I am working on understanding gene regulation and expression changes on cell type level, across evolution, development and disease. I have strong foundations in statistics and machine learning, and extensive experience combining data analysis with interactive visualizations that drive meaningful biological discoveries.

Skills

Coding	Python, R, Bash, Docker, HPC, Git, Markdown, Shiny
Analysis	Statistical analysis, Machine Learning, Deep Learning
Languages	Croatian (native), English (proficient), Spanish (intermediate), German (basic)

Experience

Bioinformatician at Biodiversity Cell Atlas April 2024 — Present
Centre for Genomic Regulation (Barcelona, Spain)

- Processing, analysis, integration and comparisons of single cell RNA-seq atlases, including data generated using different technologies, as well as curation of public datasets.

Visiting PhD Student in Computational biology lab (Stein Aerts lab) January 2024 — March 2024
Center for AI & Computational Biology, VIB-KU Leuven (Leuven, Belgium)

- Regulatory sequence analysis using convolutional neural network models.

PhD Student in Comparative regulatory genomics group (Arnau Sebé-Pedrós lab) November 2019 — April 2024
Centre for Genomic Regulation (Barcelona, Spain)

- Analysis and integration of multiomics data (single cell RNA-seq and single cell ATAC-seq, ChIP-seq, DAP-seq).
- Training machine learning models for analysis of gene expression and regulation (e.g. gene regulatory networks modeling, sequence based cell type classifiers).
- Developing interactive web applications for visualization, exploration and summary of single cell datasets.

Bioinformatician in Genomics Facility (former Tumor Profiling Unit) March 2019 — November 2019
The Institute of Cancer Research (London, UK)

- Developing computational pipelines for processing and analysis of next-generation sequencing data (RNA-seq, WGS and WES).

Education

PhD in Biomedicine, Universitat Pompeu Fabra (Barcelona, Spain) 2019 — 2024
Master's degree in molecular biology, University of Zagreb (Zagreb, Croatia) 2016 — 2018
Bachelor's degree in molecular biology, University of Zagreb (Zagreb, Croatia) 2013 — 2016

Publications

ORCID: 0000-0002-3938-2494

Elek, A., Iglesias, M., Zolotarov, G., Grau-Bové, X., Navarrete, C., and Sebé-Pedrós, A. (2025). "Decoding cnidarian cell type gene regulations". *(in preparation)*.

Levy, S., Elek, A., Grau-Bové, X., Menéndez-Bravo, S., Iglesias, M., Tanay, A., et al. (2021). "A stony coral cell atlas illuminates the molecular and cellular basis of coral symbiosis, calcification, and immunity". *Cell* 184.11, 2973–2987.e18. DOI: 10.1016/j.cell.2021.04.005.

Najle, S. R., Grau-Bové, X., Elek, A., Navarrete, C., Cianferoni, D., Chiva, C., et al. (2023). "Stepwise emergence of the neuronal gene expression program in early animal evolution". *Cell* 186.21, 4676–4693.e29. ISSN: 0092-8674. DOI: 10.1016/j.cell.2023.08.027.

Miguel-Escalada, I., Maestro, M. Á., Balboa, D., Elek, A., Bernal, A., Bernardo, E., et al. (2022). "Pancreas agenesis mutations disrupt a lead enhancer controlling a developmental enhancer cluster". *Developmental Cell* 57.16, 1922–1936.e9. ISSN: 1534-5807. DOI: 10.1016/j.devcel.2022.07.014.

Grau-Bové, X., Subirana, L., Meister, L., Soubigou, A., Neto, A., Elek, A., et al. (2024). "An amphioxus neurula stage cell atlas supports a complex scenario for the emergence of vertebrate head mesoderm". *Nature Communications* 15.1, p. 4550. DOI: 10.1038/s41467-024-48774-4.

Li, Y., Slavik, K. M., Toyoda, H. C., Morehouse, B. R., Oliveira Mann, C. C. de, Elek, A., et al. (2023). "cGLRs are a diverse family of pattern recognition receptors in innate immunity". *Cell* 186.15, 3261–3276.e20. ISSN: 0092-8674. DOI: 10.1016/j.cell.2023.05.038.

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García-Castro, H., Kenny, N. J., Iglesias, M., Álvarez-Campos, P., Mason, V., Elek, A., et al. (2021). "ACME dissociation: a versatile cell fixation-dissociation method for single-cell transcriptomics". *Genome Biology* 22.1. ISSN: 1474-760X. DOI: 10.1186/s13059-021-02302-5.

Roje, B., Elek, A., Palada, V., Bom, J., Iljazovic, A., Simic, A., et al. (2020). "Microbiota alters urinary bladder weight and gene expression". *Microorganisms* 8.3. DOI: 10.3390/microorganisms8030421.

Elek, A., Kuzman, M., and Vlahovicek, K. (2018). *coRdon: codon usage analysis and prediction of gene expressivity*. DOI: 10.18129/B9.BIOC.CORDON.

Presentations

EMBO Meeting: The evolution of animal genomes (Sevilla, Spain) September 2023
Regulatory characterization of cell types in *Nematostella vectensis*. *(poster)*

Single Cell Biology (Wellcome Trust Campus, Hinxton, UK) June 2022
Integration of whole-organism single cell atlasesfor comparative studies of animal cell types. *(poster)*

Single Cell Genomics Symposium (Barcelona, Spain) March 2022
Single cell approaches for comparative and regulatory characterization of major animal cell types. *(contributed presentation)*

BCN Single Cell Club (online) July 2021
Coral cell atlas and a quest to understand cell type evolution. *(contributed presentation)*

EMBO Meeting: The Identity and Evolution of Cell Types (online) May 2021
A stony coral cell atlas illuminates the molecular and cellular basis of coral symbiosis, calcification, and immunity. *(poster)*

Teaching and outreach

UBDS3 data science summer school (Uzhorod, Ukraine) August 2024
I prepared and conducted workshops on clustering and supervised machine learning.

NGSchool bioinformatics summer school (Warsaw, Poland and online) 2021 — 2022
I was a member of the organizing committee and developed NGSchool website.
I was teaching machine learning and programming in R, and mentored a hackathon team working on RNA-seq analysis project.

Introduction to Machine Learning, CRG internal training course (Barcelona, Spain) May 2021
I gave a lecture on feature selection and dimensionality reduction, with a hands-on session using scikit-learn.

Other activities and awards

FPI Severo Ochoa PhD scholarship by the Spanish Ministry of Science 2019 — 2024

Best Poster Award at EMBO meeting: The Identity and Evolution of Cell Types May 2021

Vienna Biocenter Summer School fellowship July — August 2017