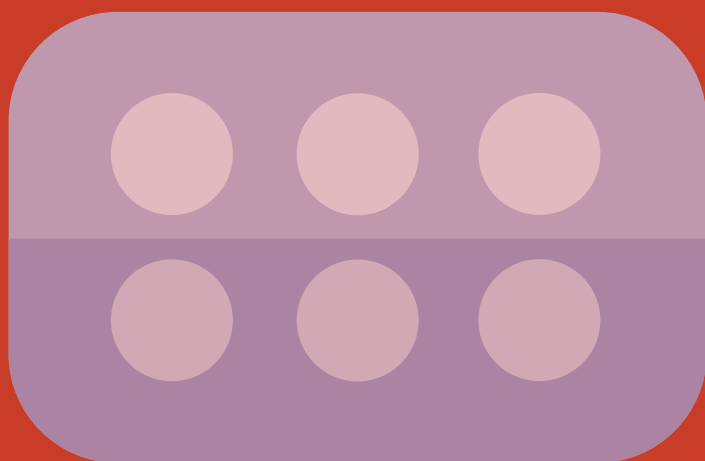# The Future of Healthcare

how bioinformatics is individualising patients to cure populations

P05 FEATURED ARTICLE
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NEW SPONSOR: NOVARTIS
NETWORKING NIGHT
R WORKSHOP WITH MATHSOC

Society News

BINFSOC

Sponsor.

We're extremely excited to announce that Novartis Australia has partnered with us. Novartis is a multinational pharmaceutical company based in Basel, Switzerland that specialises in manufacturing well known over-the-counter drugs, vaccine production, and diagnostics. Several industry representatives from Novartis Australia will be at Tuesday's Networking Night if you want to get your foot in the door.

R Workshop.

We're planning a collaboration with MathSoc in week 6 of this term to go over the basics of the R software package. This will be a two hour revision session ideal for students in BINF3010 this term, or anyone doing comp sci / engineering and want to brush up on their statistical analysis skills.

Merch.

BINFSOC are considering releasing merchandise on our website in the form of posters. We're still in the design stage, but stay tuned for some bioinformatics designs of a similar style to our BINFsights newsletters. If there's a particular design you'd like to see us to make into a poster, tell us at binfsights@unswbinfsoc.com

Student Guide.

We are now in the planning stages of a Student Guide for first year bioinformatics students. We're aiming to include info about degree structure, where to find help and advice regarding your courses, and a general overview on what to expect from the bioinformatics world. If you're interested in giving us advice on what to include, as someone thinking of changing to bioinformatics or as a past student who wishes they had been told something about their journey beforehand, contact us at binfsights@unswbinfsoc.com

BINFSOC x WIT Biotech Panel.

Recently, we hosted a career panel event in collaboration with Women in Technology (WIT) regarding the biotechnology field. We had engagement from a lot of people interested in research in attendance and we're extremely grateful to our speakers Guy Tsafnat and Denise Goldman for attending.

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As early as 2020, I believe we will be living in a world where software uses knowledge of our personal genome to guide us, like a health GPS, toward choices that are appropriate for us as individuals.

— George M. Church

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TAKE AS DIRECTED

the future of healthcare

THE MOST RECENT ADDITION TO THE BINFSOC FAMILY, NOVARTIS, IS ONE OF SEVERAL COMPANIES THAT LOOK TO THE EMERGING FIELD OF INDIVIDUAL-BASED CARE. WE LOOK AT HOW NOVARTIS USES BIOINFORMATICS TO ADDRESS THE BOTTLENECK IN PHARMACEUTICAL DEVELOPMENT.

Writer Anthony Nguyen *Editor* Cam McMenamie

the future of healthcare

The changes that we have seen in healthcare over the years have been driven by factors such as the trends in disease, the changing needs of the population, and the development of new methods and technologies in research, to name a few. The last two are particularly relevant for the movement towards more accessible and patient-centered care.

Research efforts led by global companies such as Novartis are pushing for the discovery and development of therapeutic drugs treatments that tap into this patient-centered movement.

Why is this important?
In a nutshell, treatments that tailor their approach to patients at an individual level (that is, looking at their individual metabolic, genomic and proteomic profiles) have the potential to not only find and target the roots of a patient's disease, but also bring long-term effects or cures for many of these complications. Here, we talk not just about gene therapies, but also cell therapies, discoveries of new drug targets, and importantly the validation of these approaches through clinical trials.

But we arrive at a huge bottleneck: the data and how we can make sense of it.

The Novartis Institutes of BioMedical Research is one division at Novartis that is heading this charge. The institute focuses mainly on diseases of the eye, heart, metabolism, and respiratory system, as well as issues in more broader fields like immunology and oncology.

Bioinformatics
Within these fields, the bottleneck problem is being addressed with methods from bioinformatics doctrines and collaborating with big tech companies like Microsoft. One goal might be to be able to explore potentially disease-causing mutations in an individual's genome. As was done with the FSGS experiment by researchers at Novartis, DNA from select individuals was collected, sequenced, run through computer clusters, and compared to a reference genome in order to determine which mutations were present and biologically relevant.
Another goal might be to pool together various sources of data for oncology research as a way of profiling certain

cancers on an individual level. The Oncology Bioinformatics Team is responsible for collaborating with the wet lab to find new ways to integrate and analyse high-dimensional data, for example, from the proteome, single-cell sequencing experiments, and pooled next generation sequencing (NGS) screens.

Knowing the potential genetic pathology of a disease, the scope is enormous. Gene therapy is just one step in the direction of personalised medicine.

Data

In 2019, a collaboration between Microsoft and Novartis was launched to create an Artificial Intelligence innovation lab, accelerating research and the development of future medicines and treatments. Access to biological expertise as well as powerful computing facilities brings to light the use of AI and data mining to answer questions on drug resistance, improved drug targets, and anti-tumour immunity.

Open Position @ UNSW

PhD student in single cell computational biology

SUPERVISOR
--
    Dr. Fabio Zanini
    Data Driven Biomedicine lab @ UNSW Sydney

        > fabilab.org

ABOUT THE PROJECT
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    While Physics has a standard model that explains most phenomena in the universe in terms of interactions between elementary particles, such a model is still missing in biology. To fill this gap, we are looking for a talented PhD student to create a standard model of cell biology.

        PLANNED START: third/last quarter of 2021

        MORE INFO > unswbinfsoc.com/phd-position
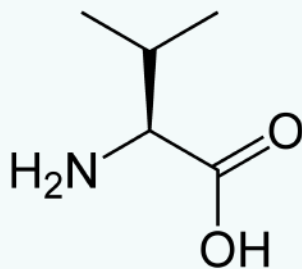
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[VALINE]

CHEMICAL STRUCTURE
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VALINE

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RNA CODONS   G U X

DISCOVERED: 1901

FIRST ISOLATED FROM CASEIN, A FAMILY OF PHOSPHOPROTEINS FOUND IN MAMMALIAN MILK.

NAMED AFTER VALERIC ACID, WHICH ITSELF IS NAMED AFTER A EURASIAN FLOWER 'VALERIAN'.

CAN BY SYNTHESIZED BY PLANTS BUT NOT ANIMALS. ESSENTIAL TO HAVE IN DIET. ASSOCIATED WITH INSULIN RESISTANCE, HIGHER LEVELS IN DIABETICS.

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sights.

Contact us

IF YOU HAVE ANY COMMENTS or feedback regarding BINFsights, please write to us at binfsights@unswbinfsoc.com

We also encourage anyone to share with us anything you'd like us to take a look at, be it a bioinformatics tool that you have made or find useful; or news in the bioinformatics world that you'd like to see written about in future issues.

TO VIEW PAST AND PRESENT issues of BINFsights, check out our website at unswbinfsoc.com/binfsights

Stay tuned on our Facebook page for updates regarding events and society news.

-- The BINFSOC Team

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