

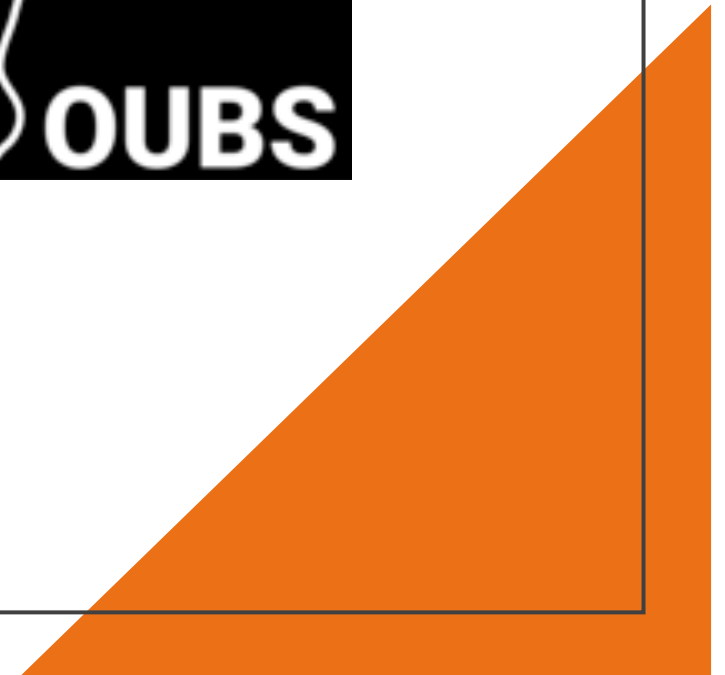
# My Career Journey

from Academia to Industry

Ege Ülgen MD, PhD

27 Nov 2023

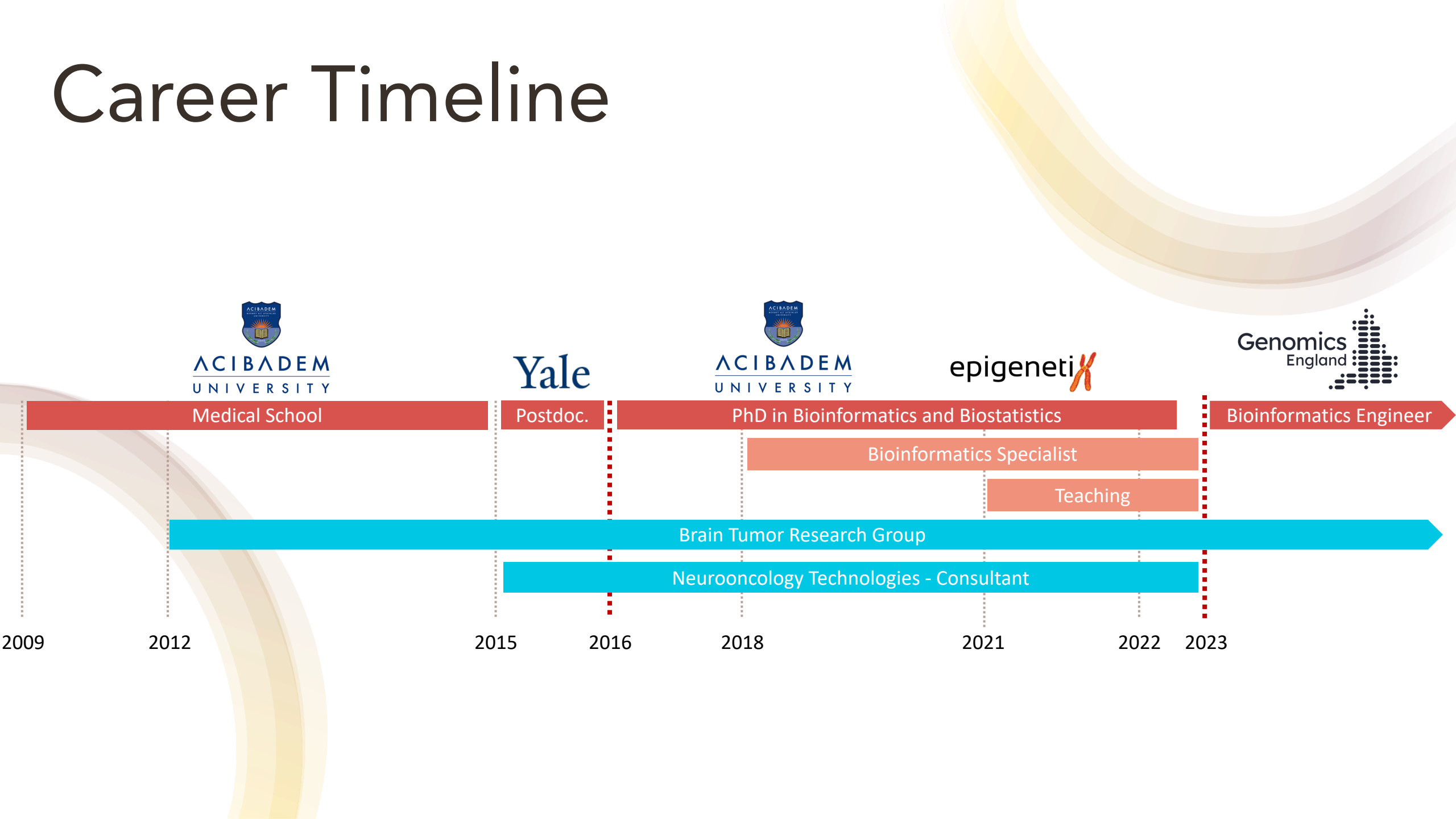
The Oxford Biochemical Society



~~Finding~~  
Building my path



# Career Timeline



ACIBADEM  
UNIVERSITY

Yale



ACIBADEM  
UNIVERSITY

epigenetiX



Medical School

Postdoc.

PhD in Bioinformatics and Biostatistics

Bioinformatics Engineer

Bioinformatics Specialist

Teaching

Brain Tumor Research Group

Neurooncology Technologies - Consultant

2009

2012

2015

2016

2018

2021

2022

2023



ACIBADEM  
ÜNİVERSİTESİ

# Initial Involvement in Biomedical Research



Yale University  
School of Medicine

Medical School

Postdoc.

PhD in Bioinformatics and Biostatistics

Bioinformatics Engineer

2009

2015

2016

2023



# ACU Medical School / Yale Internships

- Genetics research on rare diseases
- Introduction to bioinformatics
  - NGS/Whole exome sequencing
  - Variant prioritisation



ACIBADEM  
ÜNİVERSİTESİ



Yale University  
School of Medicine

420 Short Communication

Neuropediatrics

Journal of Pediatric Neurobiology, Neurology and Neurogenetics

## Clinical, Electrodiagnostic, and Genetic Features of Tangier Disease in an Adolescent Girl with Presentation of Peripheral Neuropathy

Huseyin Per<sup>1</sup> Mehmet Canpolat<sup>1</sup> Ayşe Kaçar Bayram<sup>1</sup> Ege Ulgen<sup>2</sup> Burçin Baran<sup>2</sup> Fatih Kardas<sup>3</sup>  
Hakan Gumus<sup>1</sup> Sefer Kumandas<sup>1</sup> Kaya Bilguvar<sup>2</sup> Ahmet Okay Çağlayan<sup>2,4</sup>



ELSEVIER

Official Journal of the European Paediatric Neurology Society



### Case study

#### A rare case of congenital fibrosis of extraocular muscle type 1A due to KIF21A mutation with Marcus Gunn jaw-winking phenomenon

Ayşe Kaçar Bayram<sup>a</sup>, Hüseyin Per<sup>a,\*</sup>, Jennifer Quon<sup>b,c,d</sup>, Mehmet Canpolat<sup>a</sup>,  
Ege Ülgen<sup>b,c,d</sup>, Hakkı Doğan<sup>e</sup>, Hakan Gumus<sup>a</sup>, Sefer Kumandas<sup>a</sup>,  
Nurettin Bayram<sup>f</sup>, Kaya Bilguvar<sup>g</sup>, Ahmet Okay Çağlayan<sup>b,c,d,\*\*</sup>



COLD SPRING HARBOR  
Molecular Case Studies

RESEARCH REPORT

## ALPK3 gene mutation in a patient with congenital cardiomyopathy and dysmorphic features

Ahmet Okay Çağlayan,<sup>1,2</sup> Rabia Gonul Sezer,<sup>3</sup> Hande Kaymakçalan,<sup>4</sup> Ege Ulgen,<sup>2</sup>  
Taner Yavuz,<sup>5</sup> Jacob F. Baranoski,<sup>2</sup> Abdulkadir Bozaykut,<sup>3</sup> Akdes Serin Harmanci,<sup>2</sup>  
Yalim Yalcin,<sup>6</sup> Mark W. Youngblood,<sup>2</sup> Katsuhito Yasuno,<sup>2</sup> Kaya Bilguvar,<sup>7</sup>  
and Murat Gunel<sup>2</sup>

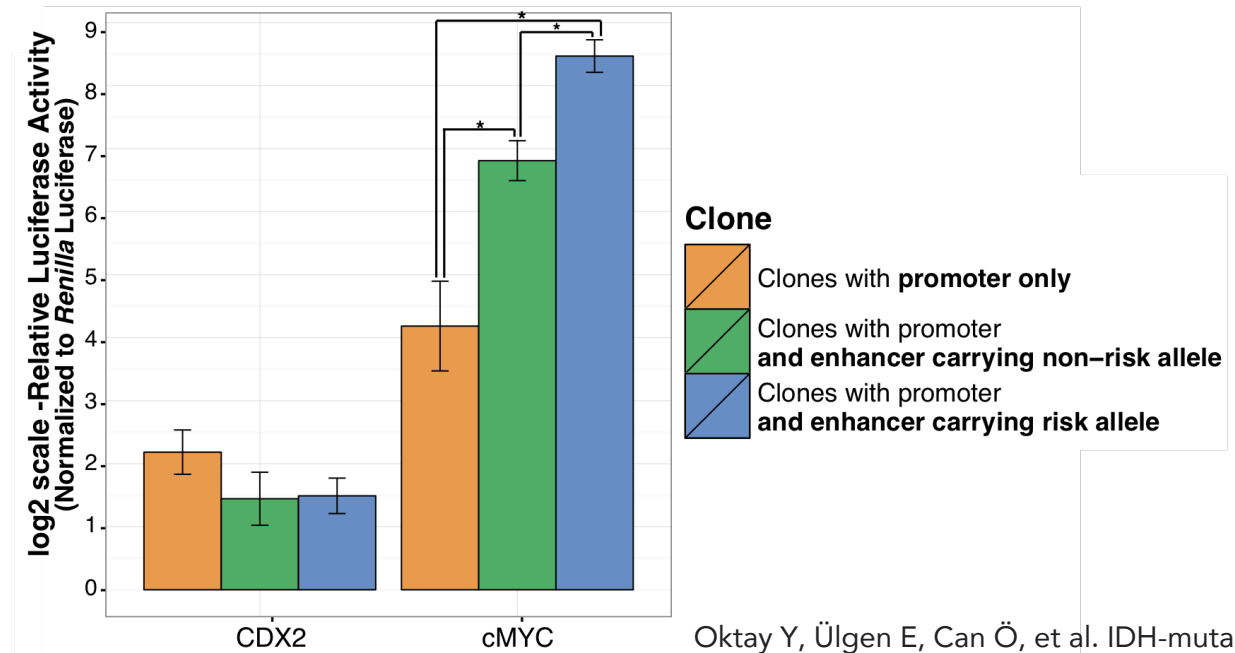
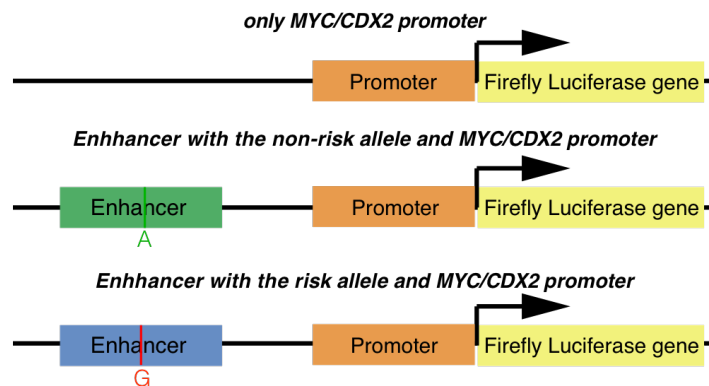
# Brain Tumour Research Group

- Research studies on brain tumours, predominantly gliomas
- Numerous peer-reviewed publications

Nature Sci Rep 2016; J Neurosurg 2018, 2019, 2021; World Neurosurg 2019; Biomedicines 2020; BMC Med Genomics 2021

Integration of knowledge and skills on multiple domains:  
medical, bioinformatics, molecular biology

c)



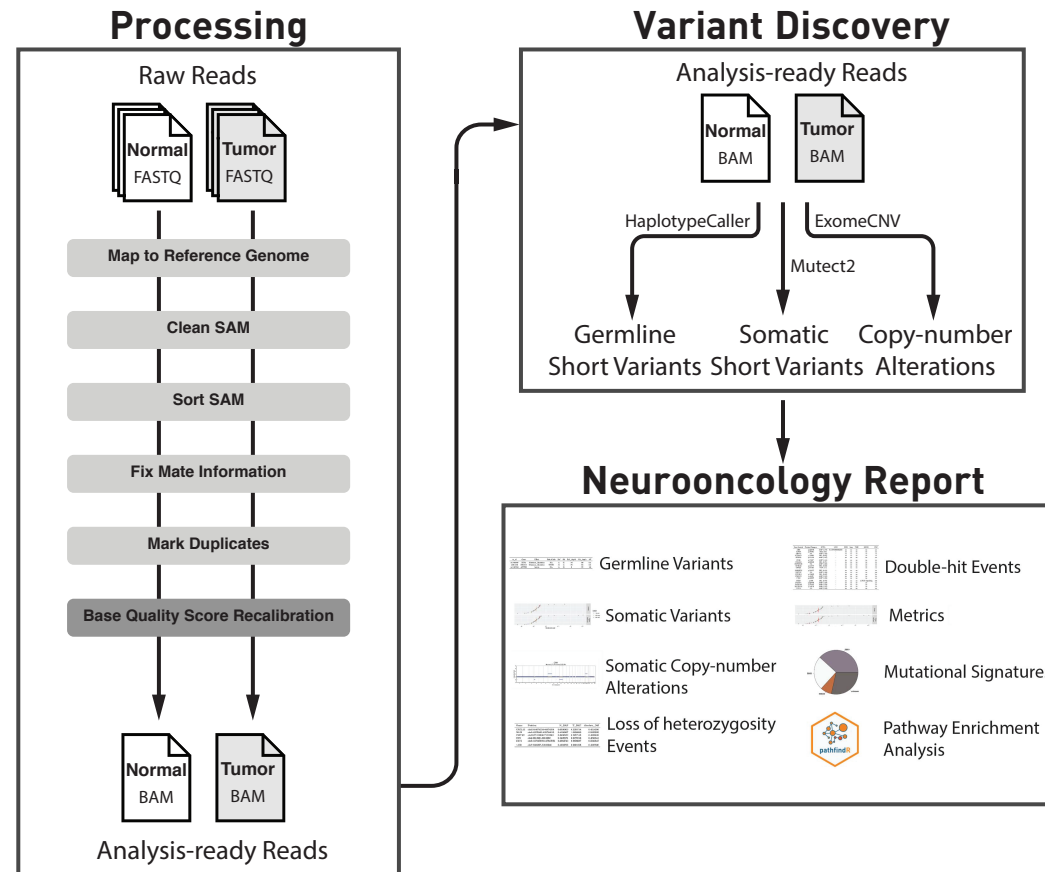
Oktaç Y, Ülgen E, Can Ö, et al. IDH-mutant glioma specific association of rs55705857 located at 8q24.21 involves MYC deregulation. *Sci Rep.* 2016;6:27569.

# Neurooncology Technologies

- Bioinformatics consultant
- Implemented and maintained a Whole Exome Sequencing analysis pipeline tailored for gliomas

Collaborative work with neurosurgeons, pathologists and oncologists to produce a personalised oncology product

Ülgen E, Can Ö, Bilguvar K, et al. Sequential filtering for clinically relevant variants as a method for clinical interpretation of whole exome sequencing findings in glioma. BMC Med Genomics. 2021 Feb 23;14(1):54.



# Shift into research path



Yale University  
School of Medicine

Medical School

Postdoc.

PhD in Bioinformatics and Biostatistics

Bioinformatics Engineer

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2023

# Postdoc at Yale

- 6-month postdoctoral work at Yale – Gunel Lab. after graduating as an MD
  - Research focus primarily on intracranial aneurysms
- Gradual shift from a medical specialization to computational research path and decision to start PhD



epigeneti

# PhD in Bioinformatics and Biostatistics

**Sezerman**  
lab  
if possible...

Medical School

Postdoc.

PhD in Bioinformatics and Biostatistics

Bioinformatics Engineer

2009

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2016

2023

# PhD in Bioinformatics and Biostatistics

- Several peer-reviewed publications
- Co-authored a book chapter on genomic variant discovery and interpretation
- Lecturer for undergrad and grad biostatistics and bioinformatics courses
- Development and maintenance of 3 R packages



# Thesis: my first major contributions to personalised oncology research

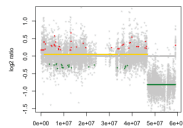
**METHODOLOGY ARTICLE** Open Access

**driveR: a novel method for prioritizing cancer driver genes using somatic genomics data**

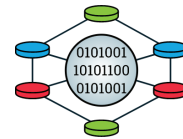
Ege Ülgen<sup>1</sup> and O. Uğur Sezerman

Check for updates

...CTCAGACCGGAAT...  
...CTCAGAGCGGAAT...



Somatic Alterations



Prior Biological Information



Cancer-specific Driver Gene Prioritization Method

Gene	Probability
gene <sub>8</sub>	0.92
gene <sub>4</sub>	0.87
...	...
gene <sub>i</sub>	0.13

Prioritized Table of Sample-specific Cancer Driver Genes

<https://doi.org/10.1093/bioinformatics/btab022>  
Advance Access Publication Date: 12 January 2023  
Original Paper

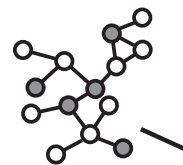
**PANACEA: network-based methods for pharmacotherapy prioritization in personalized oncology**

Ege Ülgen<sup>1\*</sup>, Ozan Ozisik<sup>2</sup> and Osman Ugur Sezerman<sup>1</sup>

Department of Biostatistics and Medical Informatics, School of Medicine, Acibadem Mehmet Ali Aydinlar University, Istanbul 3475 Turkey and <sup>2</sup>Aix Marseille University, Inserm, MMG, Marseille 13385, France

To whom correspondence should be addressed.  
Associate Editor: Alfonso Valencia

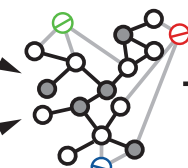
Received on August 26, 2022; revised on December 9, 2022; editorial decision on January 9, 2023; accepted on January 11, 2023



Protein interaction network



Drug-target genes resource



Extended interaction network



Sample-specific Pharmacotherapy Prioritization Method

Ranking of drugs for sample

Drug	Rank
drug <sub>5</sub>	1
drug <sub>3</sub>	2
...	...
drug <sub>i</sub>	n



# Epigenetiks – Bioinformatics Specialist

- Implementation/maintenance of:
  - Whole exome sequencing pipelines for **Rare Disease** and **Oncology**
  - **RNAseq** pipeline
  - **ATACseq/ChIPseq** pipeline
- Small-scale applications

Transition to  
Industry

Genomics  
England



Medical School

Postdoc.

PhD in Bioinformatics and Biostatistics

Bioinformatics Engineer

2009

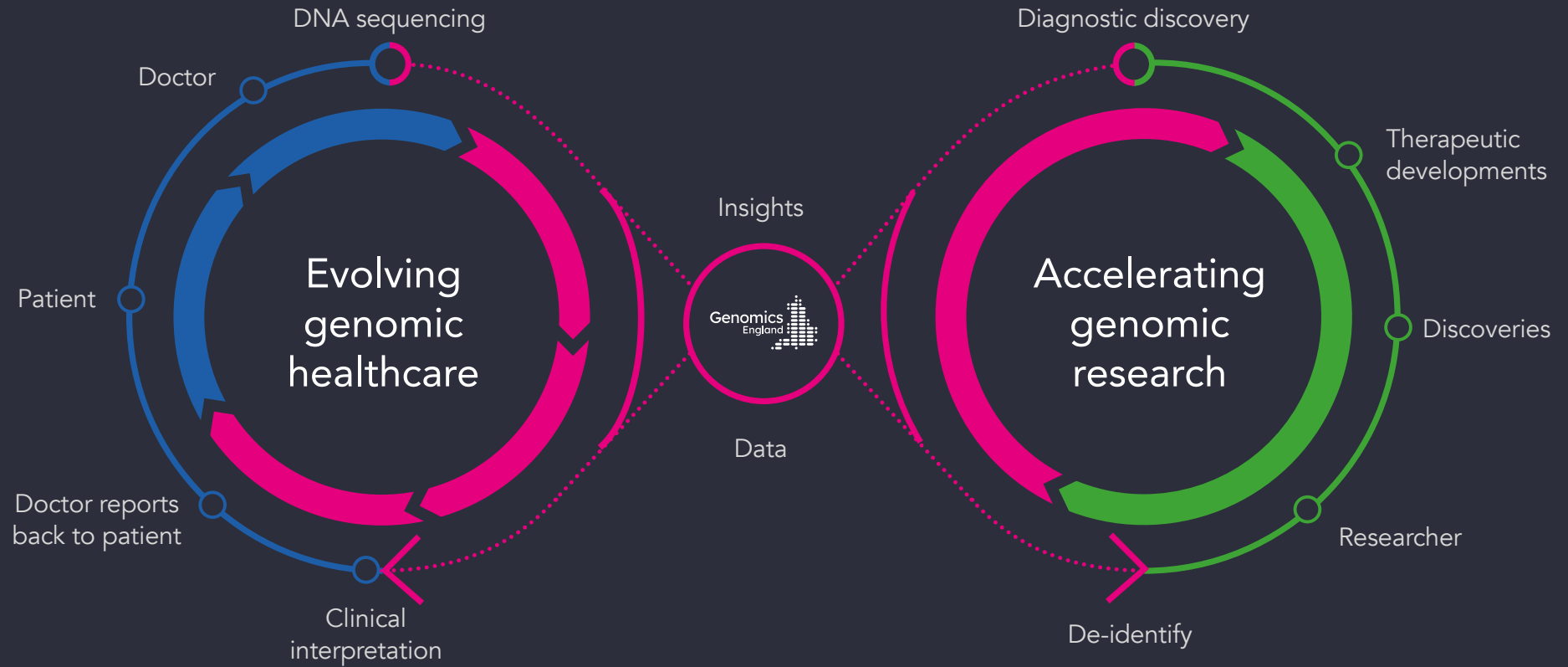
2015

2016

2023

# Decision to move to an industry job

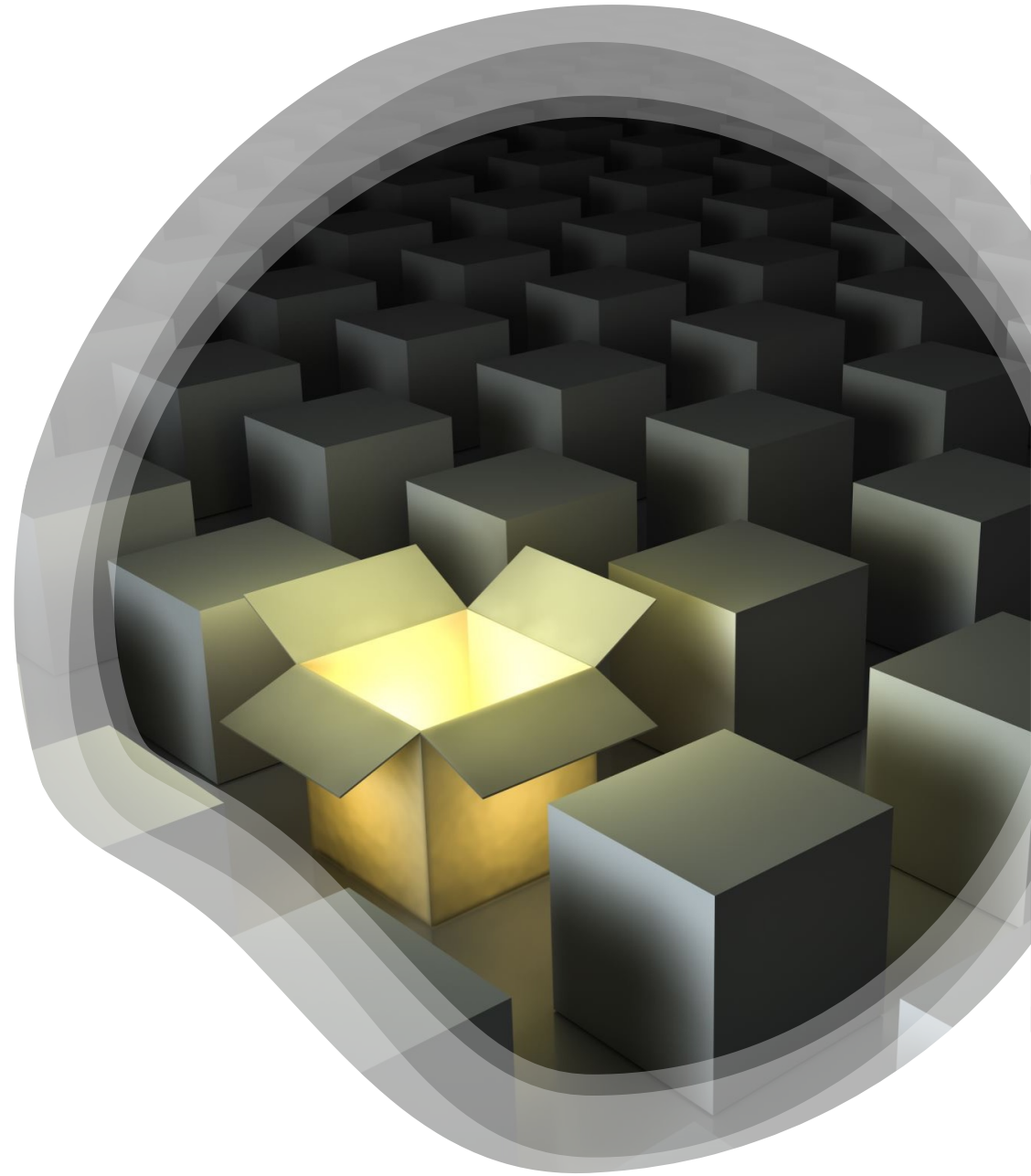
- Alignment with personal career goals
  - Desire for **direct** impact – translating research into industry applications
  - Opportunity for **innovation** and **real-life problem-solving**
- Genomics England
  - Mission to enable the delivery of genomic healthcare
  - Working with the NHS to deliver and continually improve genomic testing



# Genomics England – Bioinformatics Engineering

- SME to provide genomics-based solutions to enable personalised oncology
- Collaborating to create software for the cancer genomic medicine service
  - Software as a medical device (SaMD)
  - Highly regulated
  - Production quality code

# Insights



# Curiosity and dedication

- Continuous learning
- Adaptability
  
- Driving force for my decisions





# Evolution of Goals

- Times change, priorities shift, and opportunities present themselves
- My goals have evolved significantly over time
- I “built” my path

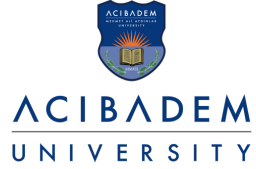


# Work-life balance

- Boundaries
  - designated work hours and dedicated personal time
- Preventing Burnout



I'm deeply grateful for all my mentors and colleagues whose support has been instrumental throughout this journey



<b>O. Uğur Sezerman</b>	H Okan Soykam	<b>Koray Özduvan</b>	Pınar Kuru Bektaşoğlu	<b>Murat Günel</b>	Leman Sencar	<b>Javier Lopez</b>	John Ambrose
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