NICHOLAS HARBOUR

PhD student at the University of Nottingham Centre for Mathematical Medicine and Biology.

My research interests are using mathematical modelling, bioinformatics and machine learning to better understand cancer and improve treatment outcomes.

EDUCATION

Present | 2022

The University of Nottingham
PhD Mathematical Biology — Nottingham, UK

- Mathematical modelling of glioblastoma growth and response to treatment.
- Analysis of single cell RNAseq data.

2022 | 2021

The University of St Andrews
MSc Mathematical Biology (Distinction) — St Andrews, UK

- **Dissertation**: Genuinely hybrid local tissue cancer invasion model: A mathematical and computational update

2021 | 2018

The University of Nottingham
BSc Natural Sciences (First Class) — Nottingham, UK

- Modules including: Differential Equations, Fluid Dynamics, Optimization, Molecular Evolution, Game Theory, Neurobiology, Fundamental Chemistry, Applied Statistics.

RESEARCH EXPERIENCE

Jul 2023 | Apr 2023

Research collaborator at Mathematical Neuro-Oncology lab (MNO)
A three month research visit to the MNO, funded by international collaboration fund grant.

Mayo Clinic AZ, USA

- Developed an ODE mathematical model for differentiation therapy in combination with radiotherapy in glioblastoma.
- Analysis of single cell RNAseq data: batch correction, count normalization, cell cycle phase assignment, pseudotime analysis.

RESEARCH GRANTS

2023

Integrated Mathematical Oncology (IMO) Workshop 11 pilot fund ($50k)
As runners up at the IMO workshop 11 our group was awarded a pilot fund of $50K to continue investigating our project: Evolutionary steering in ER+ breast cancer.

Moffit Cancer center, USA

CONTACT INFO

nicholas.harbour@nottingham.ac.uk
google scholar
github.com/Harbour-N

SKILLS

Highly experienced with developing ODE/PDE mathematical models for cancer progression and treatment response.

Matlab, R, Python, LaTeX.

OTHER INTERESTS

Squash, Running, History.

*This resume was made with the R package **pagedown**.*

Last updated on 2024-03-26.

2023 **International collaboration fund (£5,000)**
A competitive grant from the University of Nottingham to carry out purposeful research visits to international institutions.

Nottingham, UK

• With Markus Owen, Matthew Hubbard, Michael Chappell, Lee Curtin, Kristin Swanson.

TRAVEL GRANTS & AWARDS

2024 **Society of Industrial and Applied Mathematics UK and Ireland Section Meeting travel grant**
A competitive grant to cover travel costs to attend the conference. Manchester, UK

2023 **Data-driven mechanistic models of complex biomedical systems travel grant**
A competitive grant to cover travel and accommodation costs to attend the conference. Birmingham, UK

2023 **Integrated Mathematical Oncology (IMO) Workshop 11 travel grant**
A competitive grant to cover travel and accommodation costs to attend the IMO workshop.

Moffit Cancer center, USA

2022 **Dean's list**
Award for academic excellence. St Andrews, UK

PUBLISHED ABSTRACTS

2023 **Inference of cell cycle regulation between glioblastoma subpopulations in vivo to drive computational and mathematical models of the cancer complex system**
Neuro-Oncology 2023. DOI: https://doi.org/10.1093/neuonc/noad179.0150

• **Nicholas Harbour**, Lee Curtin, Sebastian Velez, Michael Chappell, Matthew Hubbard, Osama Al-Dalahmah, Peter Canoll, Markus Owen, Kristin Swanson

CONFERENCES, WORKSHOPS AND TALKS

2024 **Society of Industrial and Applied Mathematics UK and Ireland Section Meeting**
Poster - A mathematical model for BMP4 induced differentiation therapy in combination with radiotherapy in glioblastoma

Manchester, UK

2024 **Society of Mathematical Biology MathEpiOnco joint meeting**
Contributed talk - Virtual clinical trials of BMP4-induced differentiation therapy identify strategies for combination with radiation therapy for glioblastoma patients

Online

2024 **Cancer research Nottingham symposium**
Poster - Virtual clinical trials of BMP4-induced differentiation therapy identify strategies for combination with radiation therapy for glioblastoma patients

Nottingham, UK

2023 **Data-driven mechanistic models of complex biomedical systems**
Contributed talk - A mathematical model for BMP4 induced differentiation therapy in combination with radiotherapy in glioblastoma

Birmingham, UK

2023 **28th Annual Scientific Meeting of the Society for Neuro-Oncology**
Poster - Inference of cell cycle regulation between glioblastoma subpopulations in vivo to drive computational and mathematical models of the cancer complex system

Vancouver, Canada

2023 **Integrated Mathematical Oncology (IMO) Workshop 11: Steering Evolution/Extinction**
Poster - A mathematical model for BMP4 induced differentiation therapy in combination with radiotherapy in glioblastoma
Moffit Cancer Center, USA

2023 **Annual meeting of the Society for Mathematical Biology**
Poster - Mathematical modelling of cell cycle dynamics in glioblastoma subpopulations Ohio, USA

2023 **Mathematical oncology meeting**
Poster - Mathematical modelling of interacting subpopulations in glioblastoma using pseudotime
Mayo Clinic AZ, USA

TEACHING EXPERIENCE

2023 **Postgraduate demonstrator**
Helping students in problem classes, marking of coursework and exams. Nottingham, UK
• Modules including: Modelling with Differential Equations, Mathematics for Chemistry, Mathematics for Engineering, Scientific Computing, Fourier Analysis.

COMMITTEES

Present | 2022 **University of Nottingham Society of Industrial and Applied Mathematics (SIAM) student chapter**
Secretary. Nottingham, UK
• Organising society events including: industry days, maths challenge, socials.

PROFESSIONAL MEMBERSHIPS

Present | 2023 **Member, Society for Mathematical Biology (SMB)**
Member, Mathematical Oncology Subgroup.

present | 2023 **Member, European Society for Mathematical and Theoretical Biology (ESMTB)**

Present | 2024 **Member, Institute of Mathematics and its Applications (IMA)**