

NATASHA DIEDEREN

natasha-diederer.github.io

University of Warwick, Coventry, UK, CV4 7AL

natasha.diederer@warwick.ac.uk

EDUCATION

University of Warwick, UK

3rd Year, Mathematics BSc
Department of Mathematics

October 2020 - Present
Provisional First: 87% average

Sevenoaks School, UK

International Baccalaureate Diploma Programme
Higher level subjects: Mathematics, Physics, Chemistry
Extended Essay in Mathematics

2018-2020
Overall score: 44
Scores: 7 7 7
Grade: A

EXPERIENCE

Undergraduate Research Support Scheme

University of Warwick

Coventry, UK
June 2022-Present

- Ten week funded research project over the summer of 2022 focusing on minimal surfaces and mean curvature flow under the mentorship of Felix Schulze.
- First aim is to write up a comprehensive proof of Bernstein's problem for minimal surfaces, including an introduction to geometric measure theory.
- Second aim is to do a small project on mean curvature flow, interested in self similar mean curvature flow.

London Mathematical Society Summer School

Maxwell Institute

Edinburgh, UK
August 2022

- One of 50 undergraduate students selected to attend a two week programme introducing a variety of topics in modern mathematics.
- Consisted of six mini-courses on optimal transport, Stein's method, quantum algebras, inhomogeneous wave equation, mapping class groups, and binary quadratic forms.

Second Year Essay

University of Warwick

Coventry, UK
October 2021-April 2022

- 15 page essay submitted as coursework for degree, recieved overall mark of 91% for essay and oral presentation.
- Topic: Curvature estimation on triangle meshes using a generalisation of the second fundamental form.

Summer Geometry Institute

Massachusetts Institute of Technology

Remote
July 2021-August 2021

- One of 34 fellows chosen from over 600 applicants for a six week paid research programme in the field of geometry processing, organised by Justin Solomon, associate professor at MIT.
- Consisted of one week of tutorials introducing geometry processing and five weeks of research projects undertaken in small groups.
- Developed a fluid simulation algorithm that ran over triangle meshes.
- Built a user interface that used the properties of active bending to create elastic strips that would deform to the shape of a given spline.
- Generated and rendered Eulerian minimal surfaces in Houdini.
- Developed an algorithm to generate triply-periodic non-manifold minimal surfaces.

Extended Essay in Mathematics

Sevenoaks School

Sevenoaks, UK

October 2019-November 2019

- A 4000 word, self-directed research essay submitted as part of International Baccalaureate Diploma, receiving the highest grade of an A.
- Research question: Under what conditions is the triangle formed by the Euler line of a triangle maximised? Under what conditions is it minimised?

Research Essay in Mathematics

Sevenoaks School

Sevenoaks, UK

April 2019-September 2019

- Written as a precursor to the final extended essay (see above) submitted to the International Baccalaureate Organisation.
- Research question: How can the Euler line of a triangle be generalised to quadrilaterals?
- Involved extending the Euler line to quadrilaterals using both an analytic and a geometric method, proving that these two methods yielded the same line.

HONOURS AND AWARDS

The George France Mathematics Faculty Prize

June 2020

The Science Merit Prize

Both prizes awarded on graduation from Sevenoaks School.

The Duke of Edinburgh's Award (Gold level)

March 2020

The Mathematics Faculty Prize

June 2019

The Science Faculty Prize

Both prizes awarded upon completion of first year of the International Baccalaureate at Sevenoaks School.

Academic Scholarship to Sevenoaks School

December 2017

Received an offer to study at Sevenoaks School as an academic scholar from August 2018 – June 2020.

SKILLS

Mathematics

Differential geometry, geometric measure theory, real analysis

Programming

Java, Python, MATLAB

Languages

English (fluent), Mandarin Chinese (CEFR B2+), Dutch (proficient)

VOLUNTEERING

Summer Geometry Initiative

Remote

Massachusetts Institute of Technology

October 2018 - February 2020

Was a student volunteer for the tutorial week of the Summer Geometry Institute. Helped students to complete exercises relating to geometry processing.

Outreach Box Programme

Sevenoaks, UK

Sevenoaks School

October 2018 - February 2020

Played a key leadership and organisational role in expanding the Sevenoaks School Outreach Programme. This programme provided state schools in the local area with free scientific equipment to facilitate learning, including microscopes, biological models, cameras, Arduinos, and other resources.

Catalogued all equipment and updated project website, organised the logistics of distributing boxes, and designed foam packaging to protect equipment during transportation.