Hamilton Trust Summer Mathematics Research Internship 2024

Marvin Anas Hahn

23. February 2024

Coordinator: Marvin Anas Hahn

Basic details

- Tentatively planned for period for the period beginning of June to mid July

Basic details

- ▶ Tentatively planned for period for the period beginning of June to mid July
- ▶ Students (individually or in groups of 2 or 3) work for six weeks on a research project with a TCD faculty member

Basic details

- ▶ Tentatively planned for period for the period beginning of June to mid July
- ▶ Students (individually or in groups of 2 or 3) work for six weeks on a research project with a TCD faculty member
- ▶ Project must have sufficient mathematical content

Basic details

- ▶ Tentatively planned for period for the period beginning of June to mid July
- ▶ Students (individually or in groups of 2 or 3) work for six weeks on a research project with a TCD faculty member
- ▶ Project must have sufficient mathematical content
- ▶ Gong talks for which attendance is compulsory

Basic details

▶ Tentatively planned for period for the period beginning of June to mid July
▶ Students (individually or in groups of 2 or 3) work for six weeks on a research project with a TCD faculty member
▶ Project must have sufficient mathematical content
▶ Gong talks for which attendance is compulsory
▶ Each individual student must give a presentation during one of the seminars

Basic details

- Tentatively planned for period for the period beginning of June to mid July
- Students (individually or in groups of 2 or 3) work for six weeks on a research project with a TCD faculty member
- Project must have sufficient mathematical content
- Gong talks for which attendance is compulsory
- Each individual student must give a presentation during one of the seminars
- Poster session at the end of the 6 weeks to present your results to students and colleagues

Basic details

- ▶ Tentatively planned for period for the period beginning of June to mid July
- ▶ Students (individually or in groups of 2 or 3) work for six weeks on a research project with a TCD faculty member
- ▶ Project must have sufficient mathematical content
- ▶ Gong talks for which attendance is compulsory
- ▶ Each individual student must give a presentation during one of the seminars
- ▶ Poster session at the end of the 6 weeks to present your results to students and colleagues
- ▶ Moderate financial support of €900/€1575/€2025 for 1/2/3 person project

Applying

- ▶ Find a supervisor and agree on a project idea
  - ▶ Supervisor can suggest topics

Applying

- ▶ Find a supervisor and agree on a project idea
  - ▶ Supervisor can suggest topics
- ▶ Write a short one-page proposal of the project

Applying

- ▶ Find a supervisor and agree on a project idea
  - ▶ Supervisor can suggest topics
- ▶ Write a short one-page proposal of the project
- ▶ Content of the proposals is the sole determining criteria for project selection
- ▶ Selection committee will make final decision

Applying

- ▶ Find a supervisor and agree on a project idea
  - ▶ Supervisor can suggest topics
- ▶ Write a short one-page proposal of the project
- ▶ Content of the proposals is the sole determining criteria for project selection
- ▶ Selection committee will make final decision
- ▶ Faculty outside of School of Mathematics (e.g. School of Computer Science and Statistics, or School of Physics) can supervise

Applying

- ▶ Find a supervisor and agree on a project idea
  - ▶ Supervisor can suggest topics
- ▶ Write a short one-page proposal of the project
- ▶ Content of the proposals is the sole determining criteria for project selection
- ▶ Selection committee will make final decision
- ▶ Faculty outside of School of Mathematics (e.g. School of Computer Science and Statistics, or School of Physics) can supervise
- ▶ Online submission can be found at https://www.marvinanashahn.com/summerinternships

Applying

- ▶ Find a supervisor and agree on a project idea
  - ▶ Supervisor can suggest topics
- ▶ Write a short one-page proposal of the project
- ▶ Content of the proposals is the sole determining criteria for project selection
- ▶ Selection committee will make final decision
- ▶ Faculty outside of School of Mathematics (e.g. School of Computer Science and Statistics, or School of Physics) can supervise
- ▶ Online submission can be found at `https://www.marvinanashahn.com/summerinternships`
- ▶ Deadline is 5pm on Friday 22. March 2024
- ▶ **no late proposals will be accepted**

What are research projects?

- ▶ Generally seek to answer some sort of research question

What are research projects?

- ▶ Generally seek to answer some sort of research question
- ▶ Projects can take many forms

What are research projects?

- Generally seek to answer some sort of research question
- Projects can take many forms
- Extending analysis used for a known problem to answer/explore in a setting where solution is unknown

What are research projects?

- Generally seek to answer some sort of research question
- Projects can take many forms
- Extending analysis used for a known problem to answer/explore in a setting where solution is unknown
- Applying a computational method to a new problem

What are research projects?

- ▶ Generally seek to answer some sort of research question
- ▶ Projects can take many forms
- ▶ Extending analysis used for a known problem to answer/explore in a setting where solution is unknown
- ▶ Applying a computational method to a new problem
- ▶ Efficiently implementing code to do some calculation

What are research projects?

- ▶ Generally seek to answer some sort of research question
- ▶ Projects can take many forms
- ▶ Extending analysis used for a known problem to answer/explore in a setting where solution is unknown
- ▶ Applying a computational method to a new problem
- ▶ Efficiently implementing code to do some calculation
- ▶ etc. there are many possiblities depending on the research area of a supervisor and what they want to explore and what **your** interests are

Some example projects

▶ Image Restoration With Töplitz-Structure Blurring Models

Some example projects

- Image Restoration With Töplitz-Structure Blurring Models
- Counting short exact sequences of modules over $K[x]$

Some example projects

▶ Image Restoration With Töplitz-Structure Blurring Models
▶ Counting short exact sequences of modules over $K[x]$
▶ Random Fields on Manifolds

Some example projects

- ▶ Image Restoration With Töplitz-Structure Blurring Models
- ▶ Counting short exact sequences of modules over $K[x]$
- ▶ Random Fields on Manifolds
- ▶ The study of phase transitions in 2D Potts model

Some example projects

▶ Image Restoration With Töplitz-Structure Blurring Models
▶ Counting short exact sequences of modules over $K[x]$
▶ Random Fields on Manifolds
▶ The study of phase transitions in 2D Potts model
▶ Nanosheet Networks

Some example projects

- Image Restoration With Töplitz-Structure Blurring Models
- Counting short exact sequences of modules over $K[x]$
- Random Fields on Manifolds
- The study of phase transitions in 2D Potts model
- Nanosheet Networks
- Interactively Prototyping Properties of Rigid Bodies for Physically-based Animation

Some example projects

- ▶ Image Restoration With Töplitz-Structure Blurring Models
- ▶ Counting short exact sequences of modules over $K[x]$
- ▶ Random Fields on Manifolds
- ▶ The study of phase transitions in 2D Potts model
- ▶ Nanosheet Networks
- ▶ Interactively Prototyping Properties of Rigid Bodies for Physically-based Animation
- ▶ Building UTP theories with a bespoke theorem prover

Some example projects

- ▶ Image Restoration With Töplitz-Structure Blurring Models
- ▶ Counting short exact sequences of modules over $K[x]$
- ▶ Random Fields on Manifolds
- ▶ The study of phase transitions in 2D Potts model
- ▶ Nanosheet Networks
- ▶ Interactively Prototyping Properties of Rigid Bodies for Physically-based Animation
- ▶ Building UTP theories with a bespoke theorem prover
- ▶ Implementing a Convex Hull Algorithm to 4-Dimensional Datasets

Some example projects

- ▶ Image Restoration With Töplitz-Structure Blurring Models
- ▶ Counting short exact sequences of modules over $K[x]$
- ▶ Random Fields on Manifolds
- ▶ The study of phase transitions in 2D Potts model
- ▶ Nanosheet Networks
- ▶ Interactively Prototyping Properties of Rigid Bodies for Physically-based Animation
- ▶ Building UTP theories with a bespoke theorem prover
- ▶ Implementing a Convex Hull Algorithm to 4-Dimensional Datasets
- ▶ C code for Topological Data Analysis

- Some brief project idea presentations
- Questions from the audience