



ESGI<sup>138</sup>

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BATH

16 – 20 July 2018

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# Welcome

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On behalf of the whole organising committee, we would like to welcome you all to ESGI 138. It is a particular pleasure to do so in the 50<sup>th</sup> year since the founding of the then Oxford Study Group in Oxford in 1968. We will be marking this great event at the conference dinner on Wednesday. The Study Groups were set up to provide a strong mechanism for interactions between academic mathematicians and industrialists, focused around the solution of actual problems faced by industry.

Since 1968 the Study Group concept has succeeded beyond the founders' wildest dreams. There are now study groups taking place almost every month all around the world and they form a central part of knowledge exchange in mathematics. Study Groups have stimulated many close collaborations between universities and industry, have generated new mathematics, and have solved some hugely important industrial problems.

The spirit of the Study Groups has always been of open and friendly discussions, with everyone's contribution equally valued. We very much hope that ESGI 138 will continue in this strong tradition. The ESGI team has worked tirelessly with our splendid industrial partners to bring some amazing problems for you to get your teeth into. We very much hope that this will lead to great mathematics and many long-lasting collaborations. Enjoy your time in Bath!

*Chris Budd OBE (Bath) and Alan Champneys (Bristol)*

## The Local Organising Committee

- |                                    |                       |
|------------------------------------|-----------------------|
| • Professor Chris Budd OBE (Chair) | University of Bath    |
| • Professor Alan Champneys (Chair) | University of Bristol |
| • Dr David Barton                  | University of Bristol |
| • Dr Matt Butchers                 | KTN                   |
| • Dr Joanna Jordan                 | IMI                   |
| • Dr Ellen Murphy                  | IMI                   |
| • Dr Apala Majumdar                | SaMBA, Bath           |
| • Dr Paul Shepherd                 | IMI                   |
| • Mrs Juliet Somma                 | IMI                   |
| • Professor Eddie Wilson           | University of Bristol |
| • Dr Lorna Wilson                  | IMI                   |

## The Local Support Team

- Nia Fenn
- Sanne Terry
- Rachel Willis

## Upcoming ESGIs and Related Meetings

- Mathematics for industry: blockchain and cryptocurrencies, Manchester, UK, 8 September 2018
- 145<sup>th</sup> ESGI, Cambridge, UK, 8-12 April 2019
- BAMC, Bath, UK, 24-26 April 2019

# Essential Information

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## Venue

The Conference will take place on the University of Bath Campus. Most events will take place in the Chancellors' Building, although some evening sessions will take place elsewhere on campus.

## Travel to Campus

### Bus

Buses to the University campus from Bath city centre leave regularly from opposite the bus station, which is located on Dorchester Street. The bus station is visible from the train station main exit, about 200m along on the left.

You will need to catch a U1 bus. The University stop is the last on the route, as is the bus station in the other direction. Remember that there are two universities in Bath, so check you are coming to the University of Bath and not Bath Spa University.

### Taxi

There is a taxi rank directly outside Bath Train Station. The journey takes about 10 minutes and costs about £8.

### Walking

If you are feeling fit, it is a 45 minute walk up the hill to the university (not to be recommended if you have any luggage).

## Registration

Registration will be open in the Chancellors' Building from 9am on Monday 16 July 2018.

## Internet Access

Wi-Fi is available at the University via the 'eduroam' network. If you do not have access to this then please sign in to the 'WiFi Guest' network, using a cloud login.

## Conference Queries

If you have any queries during the week you have a number of options:

- Student guides will be on hand all week wearing green t-shirts
- The registration desk in the Chancellors' Building will be staffed during breaks to help with queries
- Alternatively email [ESGI138@bath.ac.uk](mailto:ESGI138@bath.ac.uk) and someone will get back to you as soon as possible

# Programme

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## Monday 16th July 2018

9.00 am	Registration Chancellors' Building – Level 2 Foyer
09.45 am	Welcome Chancellors' Building – Room 2.6
10.00 am	Problem Session 1 Chancellors' Building – Room 2.6
11.40 am	Morning Coffee Chancellors' Building – Level 2 Foyer
12.10 pm	Problem Session 2 Chancellors' Building – Room 2.6
1.30 pm	Lunch Chancellors' Building – Level 2 Foyer
2.30 pm	Group Work Chancellors' Building – Level 4 Various rooms
4.00 pm	Afternoon Coffee Chancellors' Building – Level 2 Foyer
4.30 pm	Group work Chancellors' Building – Level 4 Various rooms
6.00 pm	Drinks Reception 4 West Atrium
7.00 pm	Dinner Lime Tree Restaurant

**Tuesday 17 July 2018**

9.00 am	Group work Chancellors' Building – Level 4 Various rooms
10.30 am	Morning Coffee Chancellors' Building – Level 2 Foyer
11.00 pm	Group Work Chancellors' Building – Level 4 Various rooms
12.30 pm	Lunch Chancellors' Building – Level 2 Foyer
1.30 pm	Group work Chancellors' Building – Level 4 Various rooms
3.30 pm	Afternoon Coffee Chancellors' Building – Level 2 Foyer
4.00 pm	Group work Chancellors' Building – Level 4 Various rooms
6.00 pm	Dinner 4 West Atrium

**Wednesday 18 July 2018**

9.00 am	Group work Chancellors' Building – Level 4 Various rooms
10.30 am	Morning Coffee Chancellors' Building – Level 2 Foyer
11.00 pm	Review Session Chancellors' Building – Room 2.6
12.30 pm	Lunch Chancellors' Building – Level 2 Foyer
1.30 pm	Group work Chancellors' Building – Level 4 Various rooms
3.30 pm	Afternoon Coffee Chancellors' Building – Level 2 Foyer
4.00 pm	Group work Chancellors' Building – Level 4 Various rooms
6.00 pm	Coach to Aqua Restaurant Pick up at Coach Stop in East Car Park
6.30 pm	Conference Dinner Aqua Restaurant

**Thursday 19 July 2018**

<b>9.00 am</b>	Group work Chancellors' Building – Level 4 Various rooms
<b>10.30 am</b>	Morning Coffee Chancellors' Building – Level 2 Foyer
<b>11.00 pm</b>	Group Work Chancellors' Building – Level 4 Various rooms
<b>12.30 pm</b>	Lunch Chancellors' Building – Level 2 Foyer
<b>1.30 pm</b>	Group work Chancellors' Building – Level 4 Various rooms
<b>3.30 pm</b>	Afternoon Coffee Chancellors' Building – Level 2 Foyer
<b>4.00 pm</b>	Group work 4 West Atrium and surrounding rooms
<b>7.00 pm</b>	Working Supper 4 West Atrium
<b>till 9.00 pm</b>	Group work 4 West Atrium and surrounding rooms

**Friday 20 July 2018**

<b>9.00 am</b>	Presentation Session 1 Chancellors' Building – Room 2.6
<b>11.30 am</b>	Morning Coffee Chancellors' Building – Level 2 Foyer
<b>12.00 pm</b>	Presentation Session 2 Chancellors' Building – Room 2.6
<b>2.00 pm</b>	Lunch Chancellors' Building – Level 2 Foyer

# Presentations

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## AV

All rooms are equipped with full AV facilities which are operated from a console on the front lectern.

If you intend to present from your own laptop or Mac please ensure that you bring any adapters for VGA or HDMI. In either case, you should bring any files you require for your talk on a USB stick that can be plugged into another machine should there be any technical issues. Stewards and AV technicians will be available if you have any problems.

All rooms are equipped a Microsoft Windows 7 PC and have a PDF reader suitable for (compiled) LaTeX/beamer presentations, Microsoft PowerPoint, a media player suitable for basic video playback and a web browser.

## Introductions on Monday

Each company will give a short 10 minute presentation about their problem followed by a brief discussion.

After the introductory presentations (which finish at lunch) you are invited to select a problem and form groups. Each problem will be allocated to a room on Level 4 of the Chancellors' Building. You are free to either stay with that group for the whole week or to move between problems.

## Review Session on Wednesday by team members

All talks to be 5 minutes long with no more than 5 slides. This should highlight the vital points about the problem and the work done on it so far in the problem group. The purpose of this is to allow other groups to give their input into the problem.

## Final Presentations on Friday by team members

All talks will be at most 25 minutes long with 5 minutes for questions. This should be a report on the work of the group during the week and should summarise all that the group has achieved. The industrial partners will be present to give a response to your presentation.

## Reports

We expect a final report on each problem to be produced by the problem team within two months of the end of the study group. Each problem will have a facilitator who will give you information about writing up a final report of the problem you were working on. Examples of previous study group reports can be found at <http://www.maths-in-industry.org/>



# Refreshments

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## Daytime Refreshments

### Morning and Afternoon Breaks

Tea and coffee will be served in the Chancellors' Building Level 2 Foyer during morning and afternoon breaks throughout the week.

### Lunch

Lunches will be served in the Chancellors' Building Level 2 Foyer throughout the week. Lunch will only be available to those with an ESGI badge. Provision will be made for a variety of dietary requirements.

The University has several other venues for food should you wish any additional refreshments.

## Evening Refreshments

### Monday – Drinks Reception

On Monday evening from 6pm to 7pm the opening reception will take place in the 4 West Atrium. Drinks and canapes will be served. Please wear your delegate badge to ensure admission.

### Monday – Dinner

All delegates will be provided with a food voucher for their evening meal, when they sign in on Monday morning. This is for use at the Lime Tree restaurant on campus and can be used at any time between 7pm and 8pm.

### Tuesday – Dinner

A hot buffet dinner will be served in the 4 West Atrium. To avoid queuing, please come any time between from 6pm and 7pm.

### Wednesday – Conference Dinner

The Conference Dinner will take place in the Aqua Restaurant in central Bath on Wednesday 18 July.

Coaches will be available to take delegates to the Aqua Restaurant from campus. The coaches will pick up from the coach bays mid-way along the east car park, leaving promptly at 6pm. Please make sure you are there in plenty of time.

A limited number of coaches will be available for the return journey at 8.45pm. If you wish to take advantage of this, the coach will be available directly outside the Aqua Restaurant.

### Thursday – Working Supper

On Thursday evening a working supper will be provided in the 4 West Atrium between 7pm and 8pm. This will consist of pizza and hot and cold drinks. Alternatives will be provided for those with dietary requirements.

# Campus Map

## University of Bath Campus



# ESGI 138 Code of Conduct

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We invite you to this ESGI in a spirit of curiosity, friendliness, open-mindedness and respect. We value your participation and want to ensure a welcoming and safe environment for all. In line with University of Bath policy, we will not tolerate harassment in any form. All participants at our event are required to agree to the following code of conduct.

## Summary

This ESGI is dedicated to providing a harassment-free experience for everyone, regardless of gender, gender identity and expression, sexual orientation, age, disability, appearance, race, ethnicity or religion.

- We do not tolerate harassment of participants in any form.
- Participants asked to stop any harassing behaviour are expected to comply immediately.
- Participants violating these rules may, at the discretion of the organisers, be asked to leave the ESGI.

## Need Help?

If you are being harassed, notice that someone else is being harassed, or have any other concerns, please speak to one of the organisers or email [ESGI138@bath.ac.uk](mailto:ESGI138@bath.ac.uk).

## Be aware

Harassment includes the following:

- Offensive verbal comments related to gender, gender identity and expression, age, sexual orientation, disability, physical appearance, race, ethnicity or religion.
- Deliberate intimidation, stalking, persistent invasion of personal space, persistent harassing photography or recording, sustained disruption of talks or other events.
- Inappropriate physical contact, persistent and unwelcome sexual attention.
- Solicitation of emotional or physical intimacy accompanied by real or implied threat of professional harm, and/or offering professional favours for compliance.

This list is not exhaustive; see below for links giving further details.

Staff will be happy to help participants experiencing harassment to feel safe for the duration of the ESGI, this may include contacting security, contacting local police, or providing an escort. We expect participants to follow these rules during all elements of the ESGI.

## More information

University of Bath policy: [go.bath.ac.uk/dignity-and-respect](http://go.bath.ac.uk/dignity-and-respect)

University of Bath guide: [go.bath.ac.uk/harassment-support](http://go.bath.ac.uk/harassment-support)

## ESGI 138 Sponsors

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