

The 2012 AMSI/ANU/UQ Winter School on Geometric Partial Differential Equations, co-sponsored by PIMS & BICMR

Location: The University of Queensland

Date: July 2nd – 13th 2012

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Introduction

The Winter School is designed for post-graduate students and postdoctoral fellows. This year's School focused on recent progress in non-linear partial differential equations and their applications. In particular, the program emphasised three interlocking themes:

- Nonlinear elliptic equations and their applications to geometry and optimal transportation;
- Geometric flows and applications;
- Harmonic maps and applications.

The first week comprised introductory lecture courses by Professors Min- Chun Hong, Ben Andrews and Neil Trudinger, and the second week focused on key topics in recent research and contemporary applications.

These lectures were presented by world leaders in the area of Geometric Partial Differential Equations - Professors:

- Robert McCann (Toronto, Canada)
- Neil Trudinger (ANU, Australia)
- Xu-Jia Wang (ANU, Australia)
- Richard Schoen (Stanford, USA)
- Gang Tian (Princeton, USA and Beijing, China)
- James Sethian (Berkeley, USA)
- Tristan Rivière (ETH-Zurich, Switzerland),
- Michael Struwe (ETH-Zurich, Switzerland)

Background

The Winter School is one of AMSI's flagship higher-education programs, which comprise vacation schools ([Summer School](#), [Winter School](#) and [BioInfoSummer](#)), [Vacation Research Scholarships](#) and the [AMSI intern program](#). The annual AMSI vacation schools and scholarships are funded jointly by the Department of Industry, Innovation, Science, Research and Tertiary Education and the Australian Mathematical Sciences Institute. The 2012 Winter School is also supported by the Australian National University, the University of Queensland, the Beijing International Center for Mathematics Research and the Pacific Institute for the Mathematical Sciences.

Scientific Committee:

- Alan Carey- The Australian National University, Canberra, Australia
- Nassif Ghoussoub - British Columbia, Canada
- Robert McCann- Toronto, Canada
- Min-Chun Hong – The University of Queensland, Brisbane, Australia
- Gang Tian- Princeton University, USA
- Neil Trudinger, (Chair) - The Australian National University
- Cedric Villani - Institut Henri Poincaré in Paris, France

Organising Committee:

- Alan Carey- The Australian National University, Canberra, Australia
- Neil Trudinger (Chair) - The Australian National University
- Joseph Grotowski (Director) – The University of Queensland, Brisbane, Australia

- Min-Chun Hong (Local coordinator) –The University of Queensland, Brisbane, Australia
- Geoff Prince –Director, The Australian Mathematical Sciences Institute(AMSI), Australia
- Andree Phillips (Administration) - The University of Queensland, Brisbane Australia

Program

Nonlinear elliptic equations, optimal transportation and geometric applications.

Advanced Lectures were given by:

- Robert McCann (Toronto, Canada),
- Neil Trudinger (ANU, Australia),
- Xu-Jia Wang (ANU, Australia)

Instructional Course for one week was given by

- Neil Trudinger (ANU, Australia).

Ricci and mean curvature flow and their applications:

Advanced Lectures were given by:

- Gang Tian (Princeton, USA and Beijing, China),
- James Sethian (USA).

& Minimal surfaces and extremal eigenvalues problems

Advanced Lectures were given by:

- Richard Schoen (Stanford, USA),

Instructional Course for one week was given by:

- Ben Andrews (ANU, Australia).

Harmonic maps and applications:

Advanced Lectures were given by:

- Tristan Rivière (ETH-Zurich, Switzerland),
- Michael Struwe (ETH-Zurich, Switzerland).

Instructional Course for one week was given by:

- Min-Chun Hong (UQ, Australia).

Enrolments

Breakdown by enrolment status

Remark: this data reflects registered participants, and does not include speakers, staff or winter school organizers.

Academic & Post Doc	5
Honours	2
Masters	1
PhD	17
Total	25

Table1: Enrolments by Status: Australian participants

Academic & Post Doc	4
Honours	1
Masters	1
PhD	18
Total	24

Table1: Enrolments by Status: International participants

6.2 Breakdown by University: Australian participants

QUT	2
The U of Queensland	8
Monash	5
ANU	6
U of Wollongong	1
U of Sydney	1
UWA	2
Total	25

Table 2: Enrolments by Institution

6.3 Breakdown of Australian participants by gender

Male	24
Female	3

Table 3: Enrolments by gender

6.4 Breakdown by SES status (12 responses)

Low SES status	3
Medium/High SES status	9

Table 4: Enrolments by SES status

<i>Postcode</i>	<i>SES Code</i>
2036	m
3199/3910	m/m
3133	h
4214	m
4165	m
2336	l
4807	l
2602	h
2612	h
4825	l
4500	m
4575	m

Aboriginal and Torres Strait Islander participation

Number of Aboriginal and Torres Strait Islander participants:

No participants identified themselves as having Aboriginal or Torres Strait islander heritage.

Events

Program Events

* The Opening Ceremony for the Winter School was held in the Science Learning Centre on Monday morning. The Queensland Chief Scientist Dr Geoff Garrett was our key speaker. Dr Garrett gave a very relevant talk about Science, in particular mathematics and the increased role it plays in society and business today. Other guests included the Dean of the Faculty of Science Stephen Walker and Professors from QUT and Griffiths University.

* The morning lectures started at 9am and were either one hour or one and a half hours in duration. We broke for a coffee break and then resumed again for another hour or hour and a half till the lunch break. The afternoon sessions followed the same time plan.

* We had one afternoon on the Wednesday of the second week as a tutorial from 2- 4pm

Social Events

* A Welcome BBQ was held at Emmanuel College on the evening before the conference started. This was an opportunity to register the participants, hand out information bags including program timetables and for everyone to meet each other.

* On the Friday night, a Social Dinner was held at the Mongolian BBQ restaurant. This was a very relaxed way for all the participants to socialise with each other and relax. Drinks and Food were provided.

* The Conference Dinner was held on Thursday night July 12th at The Ship Inn at Southbank. We had a guest speaker from BIARRI who spoke of the significance of Mathematics in the work place.

Summary Report

This year's AMSI Graduate Winter School took a slightly different direction from previous years by inviting international PhD and Postdoctoral participants to attend the Graduate school as well. Further, significant funding was secured from a number of sources in addition to AMSI: ANU, UQ, PIMS, BICMR, as well as continued support from local external sponsors Biarri and QCIF. BICMR directly sponsored 10 Chinese PhD Students, and PIMS sponsored 5 Canadian students and postdocs. Furthermore, we had a contingent of other international PhD and Academic staff attend from Universities around the world, including Korea, Taiwan, USA and Italy. The increase in attention and attendance was driven by the pool of world class professors who gave lectures on this year's theme, **Geometric Partial Differential Equations**. In all there were 9 Professors who participated in the program, three from Australia and 6 International. The first week was scheduled to give preliminary lectures as an introduction for the second week of more advanced lectures.

We had a full contingent of participants: fact our quota was filled very early in the year. The overwhelming feedback that we received is that everyone enjoyed this larger contingent of participants and the breadth and variety of the lecturers.

Student Feedback:

Additional Comments about the instructional course:

The participants found the lectures very useful and in particular enjoyed the introductory lectures by Prof Andrews and Hong.

Additional Comments about Advanced Lectures:

The participants commented that they found the lectures very relevant to their work and particularly enjoyed those lectures by Prof Sethian from UC Berkeley.

Any other Additional Comments:

- The participants appreciated the organisational side of the conference.
- One suggestion was to have the lecture materials available on the web site prior to the conference for pre reading.

The best thing about the WINTER SCHOOL:

- Speakers and all the arranging
- High calibre of the speakers and their lectures
- It gives students a good opportunity to meet leading mathematicians and peers

The worst thing about the WINTER SCHOOL

- Some lectures were a bit specialised and maybe more basic expositions were needed

Do you have any suggestions for future programs:

- Make schedule less tight perhaps
- Leave more free time in the afternoons, or maybe even an evening after dinner lecture
- 1.5 hour blocks were a little hard to stay focussed for, just a 5 minute stretch half way through or between 2 x 1 hour lectures would be good

Conclusion

The expanded format and multiple funding sources provided a significant challenge to the organizers: but in the end, the 2012 AMSI/ANU/UQ Winter School was a great success.

The School provided a unique opportunity for participants to learn from so many world-leaders giving a lecture series at one event. It was a tremendous opportunity for the Australian PhD students to benchmark themselves against international students, and many realized the breadth of knowledge many of the overseas students gather in their program.

The Winter School has always been important for students to network and form potential future collaborations. The hope was that the international participants would heighten this benefit. There are a number of early indicators that this was successful: for example, attendance at the follow-on one-day workshop *Transport, Flows and Applications* at ANU; registration among student participants of the Winter School for this year's AustMS is quite high.

Appendix A – Event Program



Program
Timetable.pdf

Participant Summary Feedback

Instructional Courses:

The Courses were well organised and the lecturers knew the content well

	SA	A	N	D	SD	N/A
No	22	1	0	0	0	0
%	96%	4%	0%	0%	0%	0%

The Course was relevant to my current research

	SA	A	N	D	SD	N/A
No	8	14	1	0	0	0
%	35%	61%	4%	0%	0%	0%

I will apply knowledge gained from these courses into my current research

	SA	A	N	D	SD	N/A
No	9	11	2	1	0	0
%	39%	48%	9%	4%	0%	0%

Advance Lectures:

The lectures were well structured and the lecturers knew the content well

	SA	A	N	D	SD	N/A
No	20	3	0	0	0	0
%	87%	13%	0%	0%	0%	0%

The lectures were relevant to my current research

	SA	A	N	D	SD	N/A
No	4	13	4	3	0	0
%	17%	56%	17%	13%	0%	0%

I will apply knowledge gained from these lectures into my current research							
	SA	A	N	D	SD	N/A	
No	5	12	6	0	0	0	
%	22%	52%	26%	0%	0%	0%	
The School allowed me to develop networks with my peers							
	SA	A	N	D	SD	N/A	
No	11	11	1	0	0	0	
%	48%	48%	4%	0%	0%	0%	
I am likely to collaborate with my fellow participants as a result of attending the program							
	SA	A	N	D	SD	N/A	
No	2	12	4	2	2	1	
%	9%	52%	17%	9%	9%	4%	
The program advertising and website provided adequate information about the program							
	SA	A	N	D	SD	N/A	
No	16	7	0	0	0	0	
%	70%	30%	0%	0%	0%	0%	
I was satisfied with the organisation of the program							
	SA	A	N	D	SD	N/A	
No	21	2	0	0	0	0	
%	91%	9%	0%	0%	0%	6%	
I was satisfied with the timetabling of the program							

	SA	A	N	D	SD	N/A
No	14	2	7	0	0	0
%	61%	9%	30%	0%	0%	0%
I was satisfied with the administrative support that I received						
	SA	A	N	D	SD	N/A
No	23	0	0	0	0	0
%	100%	0%	0%	0%	0%	0%
It is important to be aware of other research being under taken in my field						
	SA	A	N	D	SD	N/A
No	18	5	0	0	0	0
%	78%	22%	0%	0%	0%	0%
The school increased my knowledge of other research being undertaken in my field						
	SA	A	N	D	SD	N/A
No	16	6	1	0	0	0
%	70%	26%	4%	0%	0%	0%
The school has strengthened my mathematical credentials						
	SA	A	N	D	SD	N/A
No	4	13	5	0	0	1
%	17%	57%	22%	0%	0%	4%
The Courses were well organised and the lecturers knew the content well						
	SA	A	N	D	SD	N/A
No	22	1	0	0	0	0
%	96%	4%	0%	0%	0%	0%

The Course was relevant to my current research

	SA	A	N	D	SD	N/A
No	8	14	1	0	0	0
%	35%	61%	4%	0%	0%	0%

I was satisfied with the Accommodation arrangements

	SA	A	N	D	SD	N/A
No	16	1	3	0	0	3
%	70%	4%	13%	0%	0%	13%

Appendix B – Feedback



AMSI/AUN/UQ 2012 Winter School Participant Evaluation Form

We would appreciate it if you could complete the following evaluation form. We use the information to improve future programs. Please tick the box that represents your response.

Instructional Courses	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
The courses were well organised and the lecturers knew the content well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The course was relevant to my current research.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I will apply knowledge gained from these courses into my current research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (please make comments on any particular course that you found useful and why):

Advanced Lectures	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
The lectures were well structured and the lecturers knew the content well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The lectures were relevant to my current research.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I will apply knowledge gained from these lectures into my current research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments (please make comments on any particular lectures that you found useful and why):

Other	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
It is important to be aware of other research being undertaken in my field	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The School increased my knowledge of other research being undertaken in my field	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The School strengthened my ability to undertake independent research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The School has strengthened my mathematical credentials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The School allowed me to develop networks with my peers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments:

Administration	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
The program advertising and website provided adequate information about the program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was satisfied with the organisation of the program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was satisfied with the timetabling of the program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was satisfied with the administrative support that I received.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was satisfied with the accommodation arrangements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Comments:

AMSI uses student testimonials for promotional purposes, we would appreciate a testimonial from you, please include your name if you are happy us to use it.

Name:

The best thing about the WINTER SCHOOL PROGRAM was:

The worst thing about the WINTER SCHOOL PROGRAM was:

Do you have any suggestions for future program formats?

Comments and/or suggestions for improvement:

THANK YOU FOR YOUR TIME

Lecturer Feedback Form

Guest Speaker Evaluation Form

We would appreciate it if you could complete the following evaluation form. We use the information to improve future programs. Please tick the box that represents your response.

COURSE	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
The course I delivered matched the academic level of most of the participants.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I achieved the goals I set out for the course.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I received sufficient support to deliver the course	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The participants will be able to apply elements of the course to their current research.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

Administration	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
I received adequate information about the program prior to its commencement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was satisfied with the organisation of the program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would have preferred more input into the design of the program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was satisfied with the timetabling of the program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was satisfied with the administrative support that I received.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was satisfied with the accommodation arrangements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

PARTICIPANT SEMINARS	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	N/A
The seminars were an important part of learning process.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The participants were given feedback that they could apply to their current research.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PARTICIPANTS	Strongly Agree	Agree	Neutral	Disagree	Very Disagree	N/A
The participants' academic level was as I expected.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I received sufficient information about the participants prior to the start of the program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The participants contributed satisfactorily in the course.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

Name: Comments and/or suggestions for improvement:

THANK YOU FOR YOUR TIME

Appendix C – Marketing Material

- **Web page:**



Web page.pdf

- **Flyer:**



grad_school_poster_
2012.pdf

- **Media/ Press Release:**



Media release Winter
School.pdf

Appendix D – Director/organiser feedback

Most comments were included in Section 10.

Although the general format of the School worked very well this year, Student talks were not included, and we need to address how they should be included in the coming years .

Up until 2011, three students present their research for 30 minutes each afternoon of the school. This format proved problematic for a number of reasons: in particular, it is a massive time commitment, and further many students are distracted by their looming presentations throughout the School and often skip lectures to work on presentations.

New formats need to be found for future years' Schools. For example, maybe all student presentations to take place in the afternoons on the first two days (students present for 10 minutes about their work). This format provides students an introduction to each other's work early in the school.

In addition, we need to ensure that supervisors assist students to fine-tune their presentations **prior to attendance** and that students must submit their presentation slides prior to the School.

Appendix E – Participant Profiles



Stephen
McCormick2.pdf



Sai Ma.pdf

Appendix F - Financial Report



Adobe Acrobat 7.0
Document

Appendix G - Participant Information



ReportAMSIFormat2
012.xlsx

Appendix H – Have you sent your photos to AMSI

All photos are in drop box

