

## Geometry and Quantum Field Theory

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The Max Planck Institute for Mathematics (MPIM) conference on *Geometry and Quantum Field Theory* took place in Bonn, Germany earlier this year (20–26 June 2010). The broad theme was the interaction between mathematics and physics. The specific themes behind the conference were

- Noncommutative geometry and index theory. Statistical models.
- Geometric issues in quantum field theory. Hamiltonian anomalies. Bundle n-gerbes.

The conference was held in honour of Alan Carey's 60th birthday. Alan Carey completed a BSc (honours) at the University of Sydney, an MSc (research) at the University of Adelaide and a DPhil at the University of Oxford. He is currently Dean and Director of the Mathematical Sciences Institute at the Australian National University, and prior to this, spent 17 years as part of the academic staff of the University of Adelaide, including 10 years as Professor and five years as Academic Dean. Alan continues to be a strong influence on mathematics both in Australia and internationally, having co-edited several books and authored over 100 research papers with more than 70 collaborators. He has co-supervised nine PhD and three MSc students.



Alan Carey with collaborators Adam Rennie (left) and John Phillips (right)

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The MPIM colloquium speaker in the week of the conference was Michael Eastwood (ANU), whose talk was entitled *Twistor theory and the harmonic hull*.

The conference featured the following keynote speakers:

- Peter Bouwknegt (Australian National University), *Quantum field theory, topology and duality*;
- Ulrich Bunke (University of Regensburg), *Differential K-theory: axioms, models and operations*;
- Joachim Cuntz (University of Muenster), *Cantor systems and number fields*;
- Keith Hannabuss (University of Oxford), *Some  $C^*$ -algebras associated to quantum gauge theories*;
- Matilde Marcolli (Caltech), *Cosmology and the Poisson summation formula*;
- Jouko Mickelsson (University of Helsinki), *Families of Dirac operators and affine quantum groups*;
- Henri Moscovici (Ohio State University), *Twisted spectral triples and conformal noncommutative geometry*;
- Michael Murray (University of Adelaide), *Bispaces and bibundles*;
- John Phillips (University of Victoria), *From two projections to the local index theorem*;
- Danny Stevenson (University of Glasgow), *Non-abelian bundle gerbes*.



The conference excursion was a boat trip to the quaint town of Linz on the Rhine

The conference also featured 14 half-hour contributed talks in areas related to geometry and quantum field theory. There were more than 50 participants.

The conference proceedings will be published in issues of the *Journal of the Australian Mathematical Society* appearing in early 2011, with guest editors Sylvie Paycha, Steve Rosenberg and Mathai Varghese.

The accommodation for participants, the excellent venue and refreshments were made possible by generous funding from the Max Planck Institute of Mathematics, Bonn. Travel to the conference was funded mainly by the National Science Foundation, the Australian Research Council and by the MPIM.

The conference organisers were: Sylvie Paycha (University of Blaise Pascal), Steve Rosenberg (Boston University), Peter Teichner (University of California, Berkeley) and MPIM, Bonn) and Mathai Varghese (University of Adelaide).

For details of the conference, lecture slides and more photos, please visit <http://www.mpim-bonn.mpg.de/Events/This+Year+and+Prospect/Geometry+and+Quantum+Field+Theory/>.