

History of the Midwest Geometry Conferences until 1998

The Midwest Geometry Conferences have been important meeting place for geometers in the Midwest. The conferences have provided a forum where researcher and students have gathered together to learn about new topics, new results, and to discuss. Participating students have had the opportunity to meet active researcher from different parts of the country and learned more about active topics in geometry and geometric analysis. Activities aimed at students and faculty at the hosting University, prepare graduate students for the conference. The length of the talks allow for more historical notes, more motivation, and more detail, than the relatively short standard conference talks. In general, the reaction of the audience has been very positive.

The Midwest Geometry Conference began in 1991. The conferences have been supported by NSF and the hosting University. The money was usually used to fully support the speakers and a partial support for other participants with a special attention to students. Several participants came with their own support.

The conferences before those supported by the grant DMS-980377 were:

1991 Kansas

1992 Kansas State

1993 Missouri

1994 Iowa

1995 Washington University (St. Louis)

1996 Oklahoma

1997 Kansas

Midwest Geometry Conferences 1998–2001

The four conferences supported by DMS-980377 were

1. October 23–25, 1998: Louisiana State University
2. November 5–5, 1999: University of Missouri - Columbia
3. November 17–19, 2000: University of Iowa
4. April 27–20, 2001: Wichita State University

The program of each of the conferences is enclosed at the end of this report. The format of the four conferences were similar.

- Each conference had four sections, each devoted to a special topic;
- Each section had two or three plenary speakers, each giving a one hour talk;
- The conferences at the University of Missouri - Columbia and at Wichita State University included also two contribution session

- Each of the speakers the invited speakers was fully supported

Each conference supported around 30 participants, including the speakers. The participation of each of the conference varied from around 40 to 60. Several of the participants were students and faculty member from the hosting University.

**The eighth Midwest Geometry Conference, Louisiana State University
October 23–25, 1998**

ORGANIZING COMMITTEE: T. Branson, G. Ólafsson (Chair), A. Sengupta, L.Smolinsky

Friday afternoon, Oct. 23: Integral Geometry

Organizer: G. Ólafsson

02:00-03:00	S. Helgason	Range questions for Radon transforms
03:00-03:30		Discussion
03:30-04:30	B. Hall	Segal-Bargmann transform and Toeplitz operators for groups
04:30-05:30	E.T. Quinto	Tomography, integral geometry, and microlocal analysis

Saturday morning, Oct. 24: Geometric Inequalities

Organizer: T. Branson

08:30-09:30	W. Beckner	Geometric inequalities and eigenvalue estimates
09:30-10:00		Discussion
10:00-11:00	M. Loss:	On the Laplace operator penalized by mean curvature
11:00-12:00	E. Lieb	Bounds on the Laplacian and eigenvalues of the Schroedinger operator

Saturday afternoon, Oct. 24: Integrable Systems

Organizer: L. Smolinsky

02:00-03:00	M. Adler	Uses of symmetries of integrable systems
03:00-03:30		Discussion
03:30-04:30	A. McDaniel	Lax equations and Prym-Tjurin varieties
04:30-05:30	Chuu-Lian Terng	Submanifold geometry and soliton equations
06:30-		Conference dinner

Sunday morning, Oct. 25: Low dimensional Gauge theory

Organizer: A. Sengupta

08:00-08:30		Coffee
09:30-10:00	S. Sawin ¹	
09:30-10:00		Discussion
10:00-11:00	A. Ashtekar	Three dimensional quantum gravity: A diffeomorphism invariant theory of connections
11:00-12:00	R. Forman	A combinatorial approach to Ricci curvature

The tenth Midwest Geometry Conference: University of Missouri - Columbia, November 5–7, 1999

ORGANIZING COMMITTEE: J. Beem, C. Bender, S. Dostoglou, D. Edidin, A. Helfer, B. Mashhoon, J. Segert, S. Wang, and Q. Zhang,

Friday afternoon, November 5: Quantum fields and geometry

Organizers: : Carl Bender and Adam Helfer

02:00-03:00		Registration
03:00-3:15		Welcome
03:15–04:15	J. Hartle	Quantum Mechanics in the Light of Quantum Cosmology
04:30–05:30	R. Wald	Quantum Field Theory in Curved Spacetime
05:45–06:15	M. Visser	Energy conditions and their implications
	R. Bishop	Spines and homology of thin Riemannian manifolds with boundary
6:15–6:45	K. Marathe	Electromagnetic resolution of curvature and gravitational instantons
7:30–		Party

Friday morning, November 6: Geometrical Methods in the topology of low-dimensional manifolds

Organizers: S. Dosoglou, J. Segert, and S. Wang

08:00-08:30	R. Salgado	Spacetime trigonometry
	R. Fulp	The algebra of gauge symmetries of Lagrangian field theories
08:30-09:30	T. Mrowka	Speculations on the relationship between instanton and Seiberg-Witten-Floer homology
09:45-10:45	M. Culler	Knots in 3-manifolds with cyclic π_1
11:00-11:30	I. Major	A formula for the fundamental group of irreducible 3-manifolds
	Bekaert	Interactions of chiral 2-forms

Friday afternoon, November 6: Recent developments in complex algebraic geometry

Organizers: D. Edidin, J. Segert, and Q. Zhang

01:00-02:00	Y.-T. Siu	Methods of $\bar{\partial}$ estimates in algebraic geometry
02:15-03:15	Y. Ruan	Orbifold Gromov-Witten Theory
03:30-04:00	C. Udriste	Dynamics induced by flows and metrics
	O. Collin	How not to obtain lens spaces by Dehn surgery along knots
04:00-04:30	V. Patrangenaru	On Mercury's perihelion advance, Pluto's "planet" denomination, ...
	N. Saveliev	Equivariant Casson invariants
04:30-05:00	L. Bombelli	Statistical geometry of random weave states
	Olkhov	On possibility of geometrical interpretation of quantum formalism
07:00-		Banquet

Sunday morning, November 6: Lorentzian Geometry and Relativity

Organizers: J. Beem, A. Helfer, and B. Mashhoon

08:00-08:30	Smith	On the connectedness of the space of initial data for the Einstein equation
	D. Galehouse	Fundamental geometry for quantum physics
08:30-09:30	G. Galloway	Null Splitting Theorem
09:45-10:45	V. Moncrief	The ADM Hamiltonian for a closed universe and its topological significance
11:00-12:00	M. Choptuik	Critical Phenomena in gravitational collapse

The Tenth Midwest Geometry Conference, Iowa, November 17 – November 19

ORGANIZING COMMITTEE: T. Branson (Chair), M. Gursky, P. Jorgensen, G. Ólafsson, L. Peterson, L. Wang

Friday afternoon, November 17: Curvature and Conformal Problems

Organizers: M. Gursky, L. Peterson, and L. Wang

12:00-01:00	Registration	
01:00-02:00	M. Eastwood	Invariant differential operators in conformal differential geometry
02:00-02:30		Discussion and break
02:30-03:30	J. Viaclovsky	Some fully nonlinear equations in conformal geometry
03:30-04:15		Discussion and break
04:15-05:15	D. Knopf	New Harnack quadratics for the Ricci flow via the space-time approach
05:15-05:30		Discussion

Saturday morning, November 18: Mirror Symmetry

Organizers: O. Durumeric and W. Seaman

08:00-9:00	R. Melrose	TBA
09:00-9:30		Discussion and break
09:30-10:30	H. Moscovici	Noncommutative transverse geometry
10:30-11:00		Discussion and break
11:00-12:00	R. Mazzeo	Nonlinear scattering on hyperbolic spaces
12:00-12:15		Discussion

Saturday afternoon, November 18: Noncompact Geometry

Organizers: P. Jorgensen and G. Ólafsson

01:30-02:30	S. Katz	The integrality conjecture for curves in Calabi-Yau threefolds
02:30-03:00		Discussion and break
03:00-04:00	B. Greene	Aspects of Mirror Symmetry and Quantum Geometry
04:00-04:45		Discussion and break
04:45-05:45	W.-D. Ruan	Lagrangian torus fibration of Calabi-Yau manifold and mirror symmetry
05:45-06:00		Discussion

Sunday morning, November 19: Physical Perspectives

Organizers: T. Branson and V. Rodgers

09:00-10:00	S.J. Gates	TBA
10:00-10:45		Discussion and break
10:45-11:45	S.G. Rajeev	Vector fields in non-commutative geometry and Yang-Mills theory
11:45-12:00		Discussion

**The Eleventh Midwest Geometry Conference, Wichita State University,
April 27 – April 29**

ORGANIZING COMMITTEE: John Beem, Buma Fridman, Lop Hing Ho, Zhiren Jin, Peter Kuchment (Chair), Kirk Lancaster, Daowei Ma, Phil Parker

Friday afternoon, April 27

12:00-01:30		Registration
01:30-02:00		Opening
02:00-03:00	S. Helgason	Range Questions for the Radon Transform
03:00-03:20		Break
03:20-04:20	S. Novikov	Poisson Structures on the Loop Spaces and Riemannian Geometry
04:20-4:30		Break

Contributed talks sessions:

04:30-05:20	G. Ólafsson	The Huyghens' Principle and symmetric space duality
05:00-5:20	Z.-D. Guan	Extremal metrics and geodesic stability principle
04:30-04:50	V. Papanicolaou	Nonlinear eigenvalue problems
05:00-5:20	R.L. Foote	Planimeters and isoperimetric inequalities on constant curvature surfaces
07:30-		Reception

Saturday morning, April 28

09:00-10:00	J.P. D'Angelo	Geometric interpretations of some positivity conditions in complex analysis
10:00-10:20		Discussion and break
10:20-11:20	S.G. Kranz	New Developments Connected to the Bun Wong/Rosay Theorem: The case of Hilbert Space
11:30-12:30	M. Agranovsky	Global Geometry of Stationary Sets

Saturday afternoon, April 28

02:00-03:00	W.P. Ziemer	Some Topological Aspects of Sobolev Mappings
03:00-03:20		Discussion and break
03:20-4:20	R. Howard	Regularity of Horizons in Spacetimes and of Riemannian Distance Functions

Contributed talks sessions:

04:30-04:50	L. Bombelli	Statistical Lorentzian geometry and the space of Lorentzian geometries
05:00-05:20	J. Ryan	Conformal Laplace and Dirac operators on the spheres and hyperbolas
05:30-05:50	N. Anghel	The spectrum of the Dirac operator on certain topological spheres
04:30-4:50	N. Zobin	Smooth functions in bad domains and Fourier analysis in Fock space
05:00-5:20	S. Morgan	Blowing up higher conversion sets to give them boundary data for harmonic maps
05:30-5:50	J. Lee	Lichnerowicz and Obata theorems for Riemannian foliations
06:30		Banquet

Sunday morning, April 29

09:00-10:00	R. Finn	Five remarkable properties of capillary surface interfaces
10:00-10:10		Break
10:10-11:10	L.D. Riego	Local Finsler geometry in a 2-d Randers space

Contributed talks sessions:

11:20-11:40	C. Udriste	From integral manifolds and metrics to potential maps
11:50-12:10	D. Auckly	Topology of a non linear sigma model
12:20-12:40	J. Segert	Frobenius varieties and quantum cohomology
11:20-11:40	A. Acker	On the existence of convex solutions for the Prandtl-Batchelor problem in fluid dynamics
11:50-12:10	S.D. Muskawad	Human aortic valve geometry - Euclidean and non-Euclidean approaches
12:20-12:40	U. Shtukar	Automorphisms groups of invariant geometric structures