

Connections for Women: Algebraic Topology

January 21 - 24, 2014

MSRI, Berkeley, CA, USA

Organizers:

Julie Bergner (University of California)

Teena Gerhardt (Michigan State University)

Brooke Shipley (University of Illinois at Chicago)

1 Workshop Description

At the heart of algebraic topology is the interplay between algebra and geometry. Foundational geometric problems are translated into algebra and meanwhile geometric tools are applied to algebraic problems. This creates a rich field of mathematics with many tools and techniques, and close ties to algebraic geometry, geometric topology, number theory, representation theory, etc. This Connections for Women workshop was the first event in the semester-long Algebraic Topology program at the Mathematical Sciences Research Institute (MSRI) in Spring 2014. The workshop was organized by Teena Gerhardt (Lead Organizer) from Michigan State University, Julie Bergner from University of California Riverside, and Brooke Shipley from University of Illinois at Chicago. The goals of the Connections for Women: Algebraic Topology Workshop were as follows:

- Highlight the outstanding work of female mathematicians in Algebraic Topology.
- Provide an introduction to several important areas of Algebraic Topology in a way that is accessible to early-career mathematicians as well as to researchers in neighboring fields of mathematics.
- Aid in the discovery and creation of mathematical connections between participants.
- Create a network of female mathematicians in Algebraic Topology where open communication about personal and professional successes and challenges is encouraged.

The workshop was very successful in meeting these goals. The workshop had three main components: mini-courses, participant talks, and a panel discussion followed by a conference dinner. These three components are discussed below.

1.1 Mini-Courses

Since one of the primary workshop goals was for it to be accessible to early-career researchers and people in neighboring fields of mathematics, the workshop was structured around 3 mini-courses each consisting of 2 one-hour lectures. All of the mini-course lecturers were prominent female mathematicians in the field: Kathryn Hess from Ecole Polytechnique Fédérale de Lausanne (EPFL), Nathalie Wahl from the University of Copenhagen, and Kirsten Wickelgren from Georgia Institute of Technology. These lecturers were chosen for both their excellence in research and their ability to communicate with a diverse audience, and indeed they gave excellent lectures. The scientific content of the mini-courses is briefly described below. Videos and typed notes for these courses are available on the MSRI website.

Operads in Algebraic Topology – Kathryn Hess

Hess provided an introduction to operads and the many important applications of operads to algebraic topology. She discussed their origin as a convenient means for understanding iterated loop spaces and ended with a discussion of Deligne’s conjecture and various solutions.

Homological Stability for Families of Groups – Nathalie Wahl

Wahl discussed a host of exciting recent homological stability results. Harer’s theorem for mapping class groups showed that the homology of the mapping class group stabilizes in certain degrees as

the genus of the surface grows. Such stability phenomena have had dramatic and far-reaching generalizations in recent times. Wahl outlined her own recent work on a general axiomatic approach which would subsume most known stability results.

Homotopy Theory and Arithmetic Geometry – Kirsten Wickelgren

Wickelgren discussed the use of homotopy theory to study non-abelian phenomena in the intersection of algebraic topology, algebraic geometry, and number theory. She focused on Grothendieck's anabelian conjectures which predict that certain schemes are determined by their étale fundamental group.

1.2 Participant Talks

Two important goals of the workshop were to highlight the work of female mathematicians and to create mathematical connections between participants. Thus participants were offered the opportunity to propose a short talk for the workshop, allowing early-career participants a chance to present their results and share their research interests. There were 5 twenty-minute participant talks, highlighting the work of promising early-career female algebraic-topologists: Emily Riehl from Harvard University, Simona Settepanella from Hokkaido University, Marcy Robertson from University of Western Ontario, Cristina Costoya from Universidad de Coruña, Anna Marie Bohmann from Northwestern University, and Angelica Osorno from Reed College (with the last two giving a talk together on their joint work). There were additionally 5 ten-minute participant talks during the workshop.

Participants gave lovely talks, and the talks covered a diverse set of research interests, including equivariant stable homotopy theory, category theory, structured ring spectra, fibre bundles, and braid groups. More details can be found on the MSRI website.

1.3 Panel Discussion and Conference Dinner

One of the workshop goals was to help create a network of female mathematicians in Algebraic Topology with open communication about personal and professional challenges, in addition to mathematics. To encourage such communication there was a panel discussion on the first day of the workshop. This panel discussed issues particularly relevant to early-career researchers, women, and members of under-represented groups. The lively discussion was guided by questions from the audience, and many audience members contributed their thoughts and experiences in addition to the panel members. The panel was scheduled immediately before the Conference Dinner and the conversations sparked during the panel continued informally throughout the evening. The panel was moderated by Teena Gerhardt (Assistant Professor at Michigan State University) and the panelists were:

Maia Averett – Assistant Professor – Mills College
 Julie Bergner – Assistant Professor – University of California Riverside
 Brenda Johnson – Professor – Union College
 Emily Riehl – Postdoc – Harvard University
 Brooke Shipley – Professor – University of Illinois at Chicago
 Nathalie Wahl – Professor – University of Copenhagen

These panelists represented a variety of career stages and types of institutions. There were panelists both with and without children and panelists who have dealt with “two-body” problems. In an online participant survey, participants responded very positively about both the panel and the dinner. One participant noted: *“I found the panel discussion about women’s experiences in their careers to be very beneficial.”* Another participant commented, *“It was great to have a chance to talk with my fellow mathematicians—many of whom I’d just met— in a more casual setting while eating delicious food.”*

1.4 Participant Response

The Connections for Women workshop was immediately followed by the Introductory Workshop in Algebraic Topology, also at MSRI. These two workshops together marked the beginning of the Algebraic Topology semester. Many of the participants in the Connections for Women workshop stayed to participate in the Introductory Workshop. The two workshops were closely coordinated, contributing to the success of both workshops.

Participants gave feedback on the Connections for Women workshop via an online survey. The participant feedback was overwhelmingly positive. One participant noted *“The workshop was a great opportunity to make new contacts and solidify old ones. I was able to work with collaborators on a project during lunch breaks. This was an excellent experience.”* Another commented, *“I had a wonderful time and thought it was excellently organized, with lots of very intense mathematics, well-balanced with much opportunity to meet and form relationships with our fellow mathematicians.”* From comments such as these as well as the huge majority of participants indicating that the overall experience was “very worthwhile,” it seems clear that the goals of the workshop were met.

Organizers

First	Last	Institution
Julie	Bergner	University of California
Teena	Gerhardt	Michigan State University
Brooke	Shipley	University of Illinois at Chicago

Speakers

First	Last	Institution
Julie	Bergner	University of California
Anna Marie	Bohmann	Northwestern University
Safia	Chettih	University of Oregon
Cristina	Costoya	Universidade da Coruna
Teena	Gerhardt	Michigan State University
John	Harper	Ohio State University
Kathryn	Hess	Ecole Polytechnique Federale de Lausanne (EPFL)
Angelica	Osorno	Reed College
Emily	Riehl	Harvard University
Marcy	Robertson	University of Western Ontario
Carmen	Rovi	University of Edinburgh
Simona	Settepanella	Hokkaido University
Jean	Verrette	University of Hawaii at Manoa
Nathalie	Wahl	University of Copenhagen
Kirsten	Wickelgren	Georgia Institute of Technology



**Connections for Women:
Algebraic Topology**

January 23 - 24, 2014

Schedule

Thursday, January 23, 2014			
9:00AM - 9:15AM	Simons Auditorium		Welcome
9:15AM - 10:15AM	Simons Auditorium	Kathryn Hess	Operads in algebraic topology
10:15AM - 10:45AM	Atrium		Tea
10:45AM - 11:45AM	Simons Auditorium	Kirsten Wickelgren	Homotopy theory and arithmetic geometry
11:45AM - 1:15PM	Atrium		Lunch
1:15PM - 1:35PM	Simons Auditorium	Emily Riehl	Limits of quasi-categories with (co)limits
1:45PM - 2:15PM	Simons Auditorium	Anna Marie Bohmann Angelica Osorno	A new equivariant infinite loop space machine
2:30PM - 3:30PM	Simons Auditorium	Nathalie Wahl	Homological stability for families of groups
3:30PM - 4:00PM	Atrium		Tea
4:00PM - 5:30PM	Commons Room		Panel Discussion
6:30PM - 8:30PM	MSRI		Dinner at Taste of the Himalayas
Friday, January 24, 2014			
9:00AM - 10:00AM	Simons Auditorium	Kathryn Hess	Operads in algebraic topology
10:00AM - 10:30AM	Atrium		Tea
10:30AM - 10:50AM	Simons Auditorium	Simona Settepanella	Braid groups in complex spaces and grassmannians
11:00AM - 11:20PM	Simons Auditorium	Marcy Robertson	Schematic homotopy types of operads
11:25PM - 11:45PM	Simons Auditorium	Cristina Costoya	Realizability of G-modules: on a dual of a Steenrod problem
11:45PM - 1:15PM	Atrium		Lunch
1:15PM - 2:15PM	Simons Auditorium	Kirsten Wickelgren	Homotopy theory and arithmetic geometry
2:30PM - 3:30PM	Simons Auditorium	Nathalie Wahl	Homological stability for families of groups
3:30PM - 4:00PM	Atrium		Tea
4:00PM - 5:30PM	Simons Auditorium	Mona Merling Jean Verrette Carmen Rovi John Harper Safia Chettih	Participants Talks

Participants		
First	Last	Institution
Meredith	Anderson	New Mexico State University
Michael	Andrews	Massachusetts Institute of Technology
Maia	Averett	Mills College
David	Ayala	Montana State University
Jeffrey	Bailes	University of Melbourne
Lauren	Bandklayder	Northwestern University
Maria	Basterra	University of New Hampshire
marzieh	bayeh	University of Regina
Irina	Bobkova	Northwestern University
Heather	Bruch	New Mexico State University
David	Carchedi	Max Planck Institute for Mathematics
Michael	Ching	Amherst College
Michael	Donovan	Massachusetts Institute of Technology
Bjorn	Dundas	University of Bergen
William	Dwyer	University of Notre Dame
Ozlem	Ejder	University of Southern California
Elden	Elmanto	Northwestern University
Maggie	Ewing	University of Minnesota Twin Cities
Brittany	Fasy	Tulane University
John	Foley	University of Copenhagen
James	Freitag	University of California, Berkeley
Jennifer	Garbett	University of Notre Dame
Paul	Goerss	Northwestern University
Matthias	Grey	University of Copenhagen
Ilya	Grigoriev	University of Chicago
Jesper	Grodal	University of Copenhagen
Ellen	Henke	University of Copenhagen
Michael	Hill	University of Virginia
Joseph	Hirsh	Massachusetts Institute of Technology
Brenda	Johnson	Union College
Inbar	Klang	Stanford University
Aradhana	Kumari	CUNY, Graduate Center
Therese	Landry	San Francisco State University
Isabelle	Laude	University of Copenhagen
Ayelet	Lindenstrauss	Indiana University
Aaron	Mazel-Gee	University of California, Berkeley
Mona	Merling	University of Chicago
Leanne	Merrill	University of Oregon
Viktoriya	Ozornova	Universität Bremen
Matthew	Pancia	University of Texas
Liz	Pannell	University of California, Santa Cruz
Kathleen	Ponto	University of Kentucky
Charles	Rezk	University of Illinois at Urbana-Champaign
Martina	Rovelli	Ecole Polytechnique Federale de Lausanne (EPFL)
Nora	Seeliger	Australian National University

Elaine	So	University of Pennsylvania
Sowmya	Srinivasan	Rutgers University
Marc	Stephan	Ecole Polytechnique Federale de Lausanne (EPFL)
Vesna	Stojanoska	Massachusetts Institute of Technology
Markus	Szymik	University of Copenhagen
Felicia	Tabing	University of California, Santa Cruz
Amelia	Tebbe	University of Illinois at Urbana-Champaign
Sean	Tilson	Royal Institute of Technology (KTH)
Massimiliano	Ungheretti	University of Copenhagen
Paul	VanKoughnett	Northwestern University
Tane	Vergili	Ege University
Deborah	Vicinsky	University of Oregon
Kay	Werndli	Ecole Polytechnique Federale de Lausanne (EPFL)
Dylan	Wilson	Northwestern University
Carol	Wood	Wesleyan University
Aliaksandra	Yarosh	University of Pittsburgh
Sarah	Yeakel	University of Illinois at Urbana-Champaign
Dimitri	Zaganidis	Ecole Polytechnique Federale de Lausanne (EPFL)

Officially Registered Participant Information

Participants		79
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Gender		79
Male	36.71%	29
Female	63.29%	50
Declined to state	0.00%	0

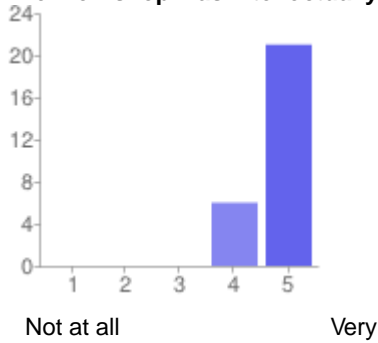
Ethnicity*		79
White	75.95%	60
Asian	7.59%	6
Hispanic	3.80%	3
Pacific Islander	0.00%	0
Black	0.00%	0
Native American	0.00%	0
Mixed	5.06%	4
Declined to state	7.59%	6

* ethnicity specifications are not exclusive

Summary [See complete responses](#)

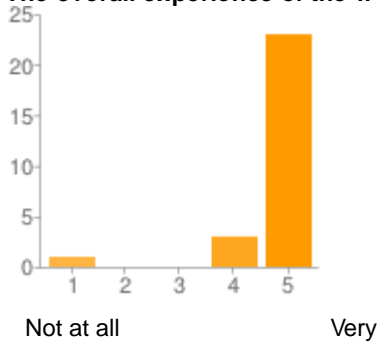
Workshop assessment

The workshop was intellectually stimulating



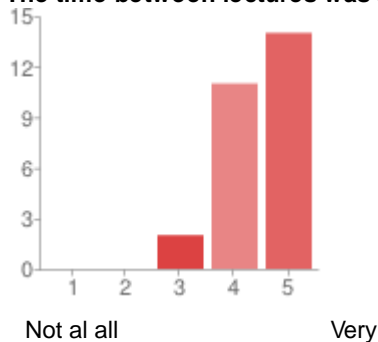
1 - Not at all	0	0%
2	0	0%
3	0	0%
4	6	22%
5 - Very	21	78%

The overall experience of the workshop was worthwhile



1 - Not at all	1	4%
2	0	0%
3	0	0%
4	3	11%
5 - Very	23	85%

The time between lectures was adequate for discussion



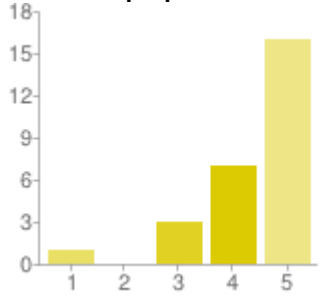
1 - Not at all	0	0%
2	0	0%
3	2	7%
4	11	41%
5 - Very	14	52%

Additional comments on the workshop organization

great I enjoyed the Connections for Women Algebraic Topology January 21 - 24, 2014 at MSRI Berkeley, CA, USA. I sent a few emails before arriving for which I did not receive a response. I had a wonderful time and thought it was excellently ...

Personal assessment

I was well prepared to benefit from the lectures

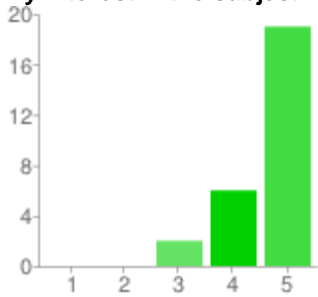


Not at all

Very

1 - Not at all	1	4%
2	0	0%
3	3	11%
4	7	26%
5 - Very	16	59%

My interest in the subject matter was increased by the workshop

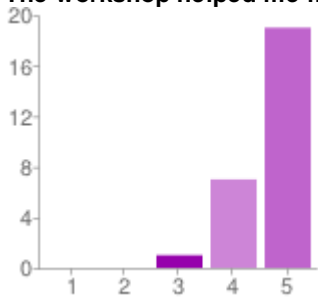


Niot at all

Very

1 - Niot at all	0	0%
2	0	0%
3	2	7%
4	6	22%
5 - Very	19	70%

The workshop helped me meet people with similar scientific interests



Not at all

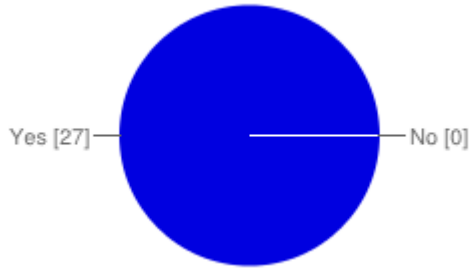
Very Much

1 - Not at all	0	0%
2	0	0%
3	1	4%
4	7	26%
5 - Very Much	19	70%

Additional comments on your personal assessment

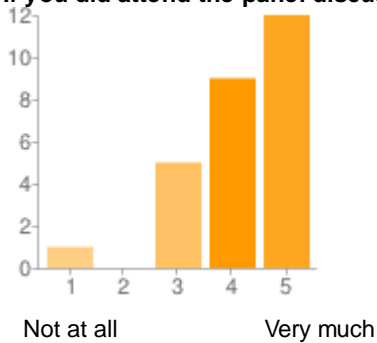
thanks!

Did you attend the panel discussion?



Yes	27	100%
No	0	0%

If you did attend the panel discussion, did you find it worthwhile?

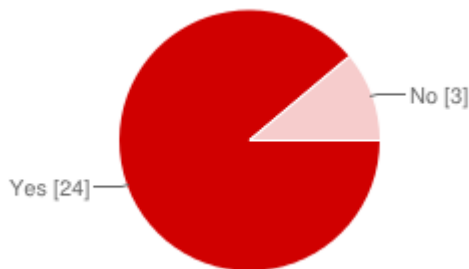


1 - Not at all	1	4%
2	0	0%
3	5	19%
4	9	33%
5 - Very much	12	44%

What other subjects should be addressed in future panel discussions?

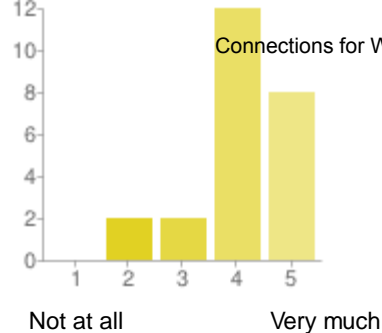
It would have been useful to have a member on the panel who did not go to Harvard. perhaps shorter more directed panels would be nice.

Did you attend the dinner?



Yes	24	89%
No	3	11%

If you did attend the dinner, did it help to solidify the contacts you made in the workshop?



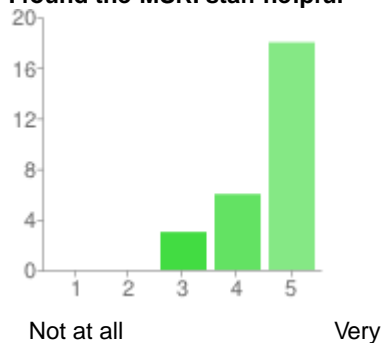
Rating	Count	Percentage
1 - Not at all	0	0%
2	2	7%
3	2	7%
4	12	44%
5 - Very much	8	30%

Please provide any comments on the dinner

more spicy food! great choice. It was great to have a chance to talk with my fellow mathematicians--many of whom I'd just met-- in a more casual setting while eating delicious food. very good food and ...

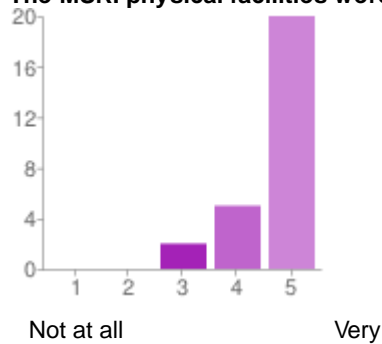
Venue

I found the MSRI staff helpful



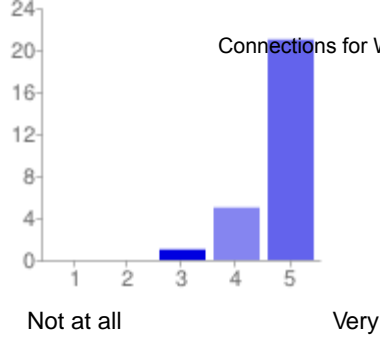
Rating	Count	Percentage
1 - Not at all	0	0%
2	0	0%
3	3	11%
4	6	22%
5 - Very	18	67%

The MSRI physical facilities were conducive for such a workshop



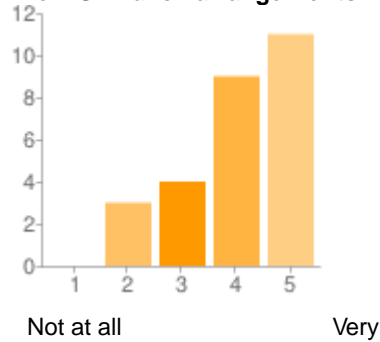
Rating	Count	Percentage
1 - Not at all	0	0%
2	0	0%
3	2	7%
4	5	19%
5 - Very	20	74%

The MSRI computer facilities were adequate for such a workshop



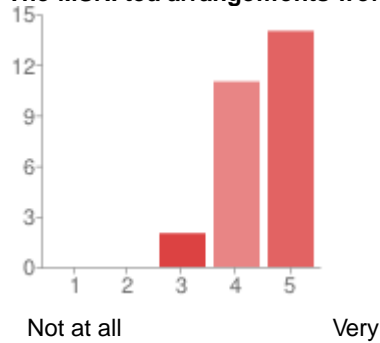
1 - Not at all	0	0%
2	0	0%
3	1	4%
4	5	19%
5 - Very	21	78%

The MSRI lunch arrangements were satisfactory



1 - Not at all	0	0%
2	3	11%
3	4	15%
4	9	33%
5 - Very	11	41%

The MSRI tea arrangements were satisfactory



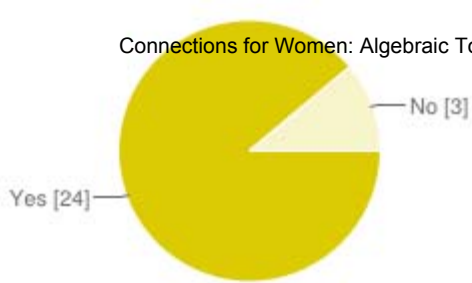
1 - Not at all	0	0%
2	0	0%
3	2	7%
4	11	41%
5 - Very	14	52%

Additional comments on the venue

Excellent. A bit difficult to get to from the airport but the shuttles from campus are convenient. The lecture hall could be improved: far too few seats are good with respect to following the lecture ...

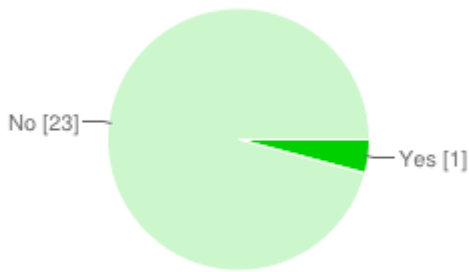
MSRI Wireless Network

Did you use MSRI's wireless network?



Did you experience any difficulties with the network?

Yes	1	4%
No	23	85%



If you did experience difficulties with the network, please explain:

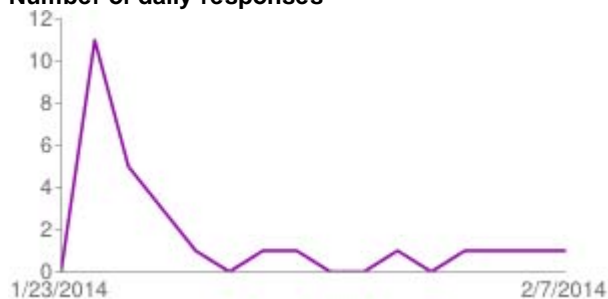
printing from my own computer was a problem. Hence I printed from a library computer instead.

Thank you for completing this survey

We welcome any additional comments or suggestions you may have to improve the overall experience for future participants.

The workshop was a great opportunity to make new contacts and solidify old ones. I was able to work with collaborators on a project during lunch breaks. This was an excellent experience.

Number of daily responses



Connections for Women: Algebraic Topology

January 23 - 24, 2014

Additional Survey Responses

Additional comments on your personal assessment

- thanks!

Additional comments on the venue

- Excellent.
- A bit difficult to get to from the airport but the shuttles from campus are convenient.
- The lecture hall could be improved: far too few seats are good with respect to following the lectures (including being able to read the blackboard!). Temperature was also an issue.
- On Friday, we were late to tea because a talk ran long and then we took a photo. By the time we got there, a lot of the snacks were gone.
- The cash only lunch was not convenient and not good.

We welcome any additional comments or suggestions you may have to improve the overall experience for future participants.

- The workshop was a great opportunity to make new contacts and solidify old ones. I was able to work with collaborators on a project during lunch breaks. This was an excellent experience.

If you did experience difficulties with the network, please explain:

- printing from my own computer was a problem. Hence I printed from a library computer instead.

What other subjects should be addressed in future panel discussions?

- It would have been useful to have a member on the panel who did not go to Harvard.
- perhaps shorter more directed panels would be nice.

Please provide any comments on the dinner

- more spicy food!
- great choice.
- It was great to have a chance to talk with my fellow mathematicians--many of whom I'd just met-- in a more casual setting while eating delicious food.
- very good food and company

Additional comments on the workshop organization

- great
- I enjoyed the lunch selection, and it was very reasonably priced
- I sent a few emails before arriving for which I did not receive a response.
- I had a wonderful time and thought it was excellently organized, with lots of very intense mathematics, well-balanced with much opportunity to meet and form relationships with our fellow mathematicians.
- I found the panel discussion about women's experiences in their careers to be very beneficial.

- The latches in the restrooms are not working properly.
- could have been more variety in lecture topics, enjoyed the short lectures
- Thank you!
- Because of the large number of people, it was a bit difficult to make new connections. It did help solidify old connections.