

A Mathematics Learning Community on Inclusive Teaching

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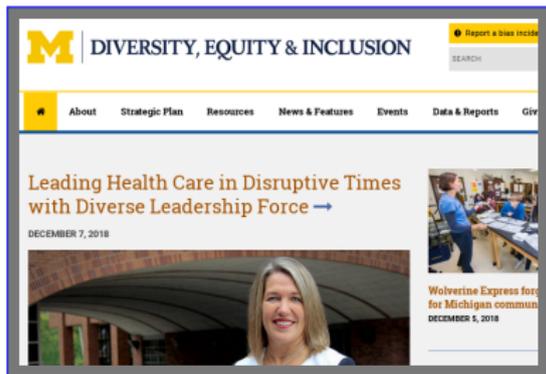
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National Context

- In higher education as a whole there is **increasing awareness of**, and sensitivity to, **issues of Diversity, Equity, and Inclusion**.
- This is manifest in their **increased visibility** institutionally, and in national forums, as well as **initiatives** at different scales.
- It is therefore an opportune time to consider these issues, perhaps not least because **work can be done at multiple levels, from personal to institutional**.



... statements about trends in higher ed are rigorously supported by anecdotal evidence.

Institutional Context

- The University of Michigan is part of this national fabric. We have a *Campuswide Strategic Plan*
 - 1 Create an Inclusive and Equitable Campus Climate
 - 2 Recruit, Retain and Develop a Diverse Community
 - 3 Support Innovative and Inclusive Scholarship and Teaching
- ... and *College initiatives*
- And (some) Institutional support.
 - FCIT Grants (up to \$1000)
 - DEI Innovation Grants (up to \$5000)

The screenshot shows the 'Strategic Plan' page for the LSA DEI Strategic Plan. At the top, there is a banner with the text 'UPDATE' and 'Download the full LSA Strategic Plan for Diversity, Equity, and Inclusion'. To the right of the banner is the LSA logo and the title 'Diversity, Equity, and Inclusion STRATEGIC PLAN'. Below the banner is a PDF icon with a download arrow. The main content area is titled 'LSA DEI Strategic Plan - Goal Status' and includes a paragraph explaining that the community is comprised of people with different roles and contributions. Below this are two sections: 'Faculty Related Goals' and 'Undergraduate Education Goals', each with a list of goals and a plus sign icon to the left of each goal.

Strategic Plan

UPDATE
Download the full LSA Strategic Plan for Diversity, Equity, and Inclusion

LSA COLLEGE OF LITERATURE, SCIENCE, AND THE ARTS
UNIVERSITY OF MICHIGAN

Diversity, Equity, and Inclusion
STRATEGIC PLAN

PDF

LSA DEI Strategic Plan - Goal Status

LSA's community is comprised of people with different roles—faculty, staff, and graduate and undergraduate students—each with its own needs and contributions to make around diversity, equity, and inclusion. To see the progress status for each group's goals, click on the headers below.

Faculty Related Goals

- + Improve Faculty Retention and Departmental Climate
- + Improve Faculty Mentoring and Career Advising
- + Faculty Recruitment
- + Build Faculty Accountability and Expertise

Undergraduate Education Goals

- + Recruit, Retain, and Support Transfer Students
- + Minimize Differential Access to Resources for Students
- + Build More and Better Student Recruitment Pipelines
- + Improve the Support, Opportunities, and Rewards for Inclusive Teaching Across LSA Curriculum

Departmental Context

- Our Department of Mathematics is fairly big
 - About 60–65 T/TT faculty, 65–75 postdocs, 15 lecturers, and 130 graduate students.
 - Teaching 250–370 undergraduate class sections/semester
 - With a highly structured Introductory Program (our course before calculus, calculus I, and calculus II).
- And has done some work on education and reform:
 - Calculus reform (1992–present)
 - IBL center (2004–present)
 - Seminar on Teaching Mathematics (2003–present)



A Learning Community on Inclusive Teaching

- A FCIT grant (\$1000) from our CRLT; work with **Nina White**, to whom most of the credit should go.

“... inclusive classroom practices can help address [attraction and retention of minorities]... We will create a community of instructors who will discuss these issues... [to attain] the knowledge and resources to better support [these students]... Our new group—Inclusive Teaching in Mathematics—will build on existing communities in the Department of Mathematics with deep interests in effective teaching... [meeting] through the winter semester to discuss readings and research, and will bring in outside speakers, to accomplish its goals.”

- **Premise:** *Prerequisite to meaningful Departmental change are*
 - Exploration and background, and
 - Building a core of instructors with knowledge and appropriate skills.



LCIT: Structure and Set-Up

- Invitation to **all faculty and graduate students in mathematics**, and members of **the School of Education**.
- **Four discussion sessions, one outside speaker, one concluding discussion.** . . . *plus a number of follow-up and subsequent sessions*
- Discussion sessions met **over lunch** (provided by grant funding)
 - For each: **specific readings**, with **discussion leaders**.
 - **Synopsis, questions, discussion.**
 - *Partial model: IBL lunches in Department.*
- **Supplemental funding** from within the Department covering speaker travel

• Readings for 3 April, 2018

In this session, we will look at inclusion and assessment. Harrison Bray and Nina White will lead a discussion following supporting readings. *Please fill out [this survey](#) before 11:59pm on Thursday 3/29, to help the session.*

Supporting reading:

- [Assessing Assessment](#), by Lynn Steen. This is the introduction to the MAA assessment volume linked in
- [Framing Equity](#), by Rochelle Gutierrez. This is pp.5-6 in this document, and questions for discussion
- Optional complimentary readings are in the [MAA Instructional Practice Guide](#). The sections on assessment and equity, pp.157-166 are particularly relevant for our discussion. We especially recommend the eq will enhance the other (very short!) readings.

• Readings for 7 March, 2018

In this session, [Nancy Kress](#), from the University of Colorado, Boulder, will speak on instructional strat

LCIT: Scheduling and Other Considerations

- *When to meet?*
 - **Math Teaching Seminar** (Mondays, 5:15–6:30pm), or
 - **Overlap other seminars** (Most days, 3pm–), or
 - **Lunch** (conflicting with teaching schedules).
- *Finding appropriate readings*
 - **Rely on local experts.**



Monday, December 10, 2018

12:00pm-12:50pm	Mathematical Biology – Jeff Dunwoth (University of Michigan) <i>Disruption of excitation/inhibition balance in cortical neuronal networks</i> – 335 West Hall
3:00pm-4:00pm	Student Dynamics – Yueqiao Wu (University of Michigan) <i>The Earthquake Flow</i> – 1060 East Hall
3:00pm-5:30pm	Special Events – Andrew Mellis (UM) <i>Dissertation Defense: Theoretical and Numerical Analyses of Deviations between Kingman's Coalescent and the Wright-Fisher Model</i> – 2104 Modern Languages Building
4:00pm-5:00pm	Complex Analysis, Dynamics and Geometry – Wenjuan Peng (UM visitor) <i>On the cycles of components of disconnected Julia sets</i> – 3088 East Hall
4:00pm-5:20pm	Group, Lie and Number Theory – Yuan Liu (Univ of Wisconsin) <i>A non-abelian version of Cohen-Lenstra heuristics</i> – 4088 East Hall
4:00pm-5:00pm	Student Combinatorics – Trevor Hyde (University of Michigan) <i>Categorifying Numbers</i> – 3866 East Hall
4:00pm-6:00pm	Geometry & Physics – Nathan Priddis (BYU) <i>BHK Mirror symmetry and variants</i> – 4096 East Hall

Tuesday, December 11, 2018

2:30pm-5:00pm	Special Events – Robert Walker (UM) <i>Dissertation Defense: Uniform Symbolic Topologies in Non-Regular Rings</i> – 3205 Modern Languages Building
3:00pm-4:00pm	Student Geometry/Topology – Daniel Stoll (University of Michigan) <i>Triangulating Rotations (and Rotating Triangulations)</i> – 1866 East Hall

Wednesday, December 12, 2018

3:00pm-4:00pm	Financial/Actuarial Mathematics – Gaoqun Guo (UM) <i>Robust hedging with local time and Skorokhod embedding</i> – 1360 East Hall
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Thursday, December 13, 2018

1:00pm-2:30pm	Student Homology Theory – Moritz Gill (University of Michigan) <i>Introduction to the Goodwillie calculus</i> – 1360 East Hall
5:00pm-5:30pm	Special Events – Jingchuan Xiao (UM) <i>Math 631 Student Presentations: Elliptic Curves</i> – 4088 East Hall
5:30pm-6:00pm	Special Events – Jack Carlisle (UM) <i>Math 631 Student Presentations: Sheaves</i> – 4088 East Hall
6:00pm-6:30pm	Special Events – Yuping Ruan (UM) <i>Math 631 Student Presentations: Riemann Surfaces from an Analytic Perspective</i> – 4088 East Hall
6:30pm-7:00pm	Special Events – Khoa Dang Nguyen (UM) <i>Math 631 Student Presentations: ADE Singularities</i> – 4088 East Hall

Outcomes: Meetings

- Schedule

Date	Event	Topic
2/6/2018	Discussion 1	Context & background
2/20/2018	Discussion 2	Inclusivity & strategies
3/7/2018	External Speaker	Instructional strategies
4/3/2018	Discussion 3	Inclusivity & assessment
4/17/2018	Discussion 4	Implicit bias & synthesis
5/30/2018	Concluding Discussion	Closure & questions

- Sample Readings: Discussions 1, 2

- 1 Position on Access and Equity in Mathematics Education (NCTM)
Teaching with Women in Mind (AMS Notices)
6 Ways Math Instructors Can Support Diversity and Inclusion (AMS teaching blog)
- 2 Toward Inclusive STEM Classrooms: What Personal Role Do Faculty Play?
(CBE–Life Sciences Education)
How a Detracked Mathematics Approach Promoted Respect, Responsibility, and High Achievement. (Theory Into Practice)
CRLT exercises

Outcomes: Community Numbers

- **Attendance** was generally good.
 - Winter 2018 events averaged **16 attendees, 37 in total**, with **15 attending at least three** sessions.
 - Attendees were **approximately evenly split** between **T/TT faculty, lecturers, post-docs**, and **graduate students** (though graduate students were the least-well represented).
- **Collegial and open discussions** were the norm.
 - ... which may reflect **Departmental culture**.
 - But: note **graduate student attendance**.

... and self-selection

Outcomes: Community Work

- **Goal:** “[to attain] the knowledge and resources to better support [these students]. . . ”
 - Inclusivity in teaching *is a big issue*.
 - We definitely **increased awareness, and knowledge**, and
 - **increased individuals’ resources**.
- **Implied Goal:** facilitate change in instructors’ teaching.
 - This is *harder to measure*.



Outcomes: Instructional Impact

- While it is difficult to measure impact in the classroom, we came to a number of **key insights**:
 - **Avoid a deficit perspective**: *Look for and emphasize students' understanding and competence, not errors.*
 - **Assign competence**: *Recognize students' success and contributions publicly.*
 - **Manage groupwork**: *Take an active role during groupwork to support inclusive group dynamics.*
 - **Create classroom community**: *Focus on increasing students' sense of belonging in class, and in mathematics.*
 - **Be self aware**: *Of implicit biases, habits and language.*



Outcomes: New Questions

- And these raised a number of **new questions**:
 - How do we create community?
 - How do we better recognize what we need to be aware of and change?
 - How do we make all of these things natural parts of our teaching?



Outcomes: Artifacts and Discernable Impact

- This talk.
- (Forthcoming. . .) [post](#) for the [AMS inclusion/exclusion blog](#) about our work.
- [Work on our new instructor training program](#).
 - [Week-long program](#), for all new graduate students and post-docs.
 - [Increased focus on inclusive teaching](#), with a CRLT workshop at the start of the week and some interleaving of topics throughout.



Conclusions and Reflections

- Our Community did arrive at some **key insights**,
- And an **underlying framework** to think about issues of inclusivity:
 - **Levels of Action**
Individual, Programmatic, and Departmental
- **Programmatic actions:**
 - **Think critically about assessment structures** in large, coordinated courses.
 - **Highlight contributions of mathematicians in underrepresented groups.**
- **Departmental actions:**
 - Work with our **instructor training programs**:
Clearly note that our teaching is not de facto inclusive, and Provide instructors with strategies

A Mathematics Learning Community Teaching (LCIT)
Faculty Communities for Inclusive Teaching, 2018

Project Overview

- **Structure:** Faculty, post-docs, and grad students met 5x times in W18 to discuss readings on inclusive teaching in math, with a SP, wrap-up meeting in May
- **Goals:** (1) increase awareness of barriers to inclusive teaching and strategies for teaching more inclusively, (2) build and support a community within Department committed to inclusive teaching, and (3) support instructor training

Key Insights / New Questions

Individual Actions

- Teaching orientation: See the Value in Student Thinking / Avoid a Deficit Perspective (see ...)
- Teaching Strategy: Assigning Competence
- Personal reflection: Recognize our own in biases. *How do we overcome them?* ...
- Managing groups: Take active role during to monitor and support inclusive group dynamics
- Creating community: Focus on increasing sense of belonging in our classrooms and, by mathematics more generally. *How do we*

Conclusions and Questions

- ... and these led naturally to **more questions**
 - How to **balance uniformity and resistance to academic dishonesty with promotion of a growth mindset and sense of belonging?**
 - How to **show underrepresented mathematicians** and implement strategies meaningfully and authentically?



A Continuing LCIT

- **Two meetings in Fall 2018**
With residual funding—due to Departmental support, and cheap lunches.
- **Application for renewed funding for Winter 2019**
 - **Increase graduate student engagement**
Graduate students teach many of our introductory courses, are a substantial part of our department, and may be teaching for years to come.
 - **Improve inclusivity of our Community**
Survey attendees who came only once.
 - **Improve application of instructional strategies**
Focus discussions, follow-up surveys.
 - **Continue engagement with Department and Introductory Program**
Work on new instructor training, larger programmatic issue.

Complementary Activities

- **Exam analysis project**
 - Internally funded (CRLT grant of \$10,000, plus \$5,000 of Department funding).
 - Goal: **Analyze Introductory Program exams**, to determine characteristics and changes over time, and how these may speak be more (or less) inclusive of underrepresented groups.
 - **Initial analysis in summer 2018**, continuing in summer 2019.
- **Increased mastery assessment** in our large enrollment courses
 - **Pilot test in differential equations**
 - **Proposal for Introductory Program**



Concluding Thoughts

- Our departmental environment facilitated the LCIT
 - Departmental culture
 - Departmental engagement
- We benefit tremendously from University resources
- ... *But neither of these are necessary for this work*
 - Individual classrooms can be inclusive, and this has always been the case.
- Our scale and uniformity is a challenge and an opportunity
 - My course, this fall: 3 copied lab reports, 60 students with a common homework solution.
 - But: we have an administrative structure and authority to affect change.

Resources and Links

- Gavin LaRose: glarose@umich.edu
- LCIT page:
<http://www.math.lsa.umich.edu/~glarose/dept/teaching/lcit.html>