

Conference Board of the Mathematical Sciences
One Hundred and Twenty-second Meeting of the Council
Friday, December 6, 2019

ASA Headquarters Building
732 North Washington Street
Alexandria VA 22314

- 8:30-9:00 **Coffee, Juice, and Breakfast Treats Available**
- 9:00-9:45 EHR Report, Karen Marrongelle
- 9:45-10:00 **Introductions and Overview of Meeting** – Diane Briars
- 10:00-10:45 **Business Meeting of the Council**
1. Secretary-Treasurer's Report – Charles Steinhorn
 Approval of Minutes of the Meeting of May 3, 2017 (appendix A)
 FY 2019 Operating Budget Income/Expense Report (appendix B)
 Unrestricted Net Assets History (appendix C)
 FY 2020 Dues assessment (appendix D)
 2. Director's Report, including Pathways Forum – David Bressoud (appendix E)
 3. Auditor's Report (see report at www.cbmsweb.org/council-meeting-materials/)
 4. Announcements
 - Lorraine Howard, WME .
- 10:45-11:00 **Break**
- 11:00-12:00 Dana Center Launch Years Project, Sovde and Coe
- 12:00-1:00 **Lunch**
- 1:00-1:45 MoMath, Cindy Lawrence
- 1:45-2:30 NRC reports, Michelle Schwalbe
- 2:30-2:45 Ana Ferraras and John Staley on ICME-14
- 2:45-3:00 **Break**
- 3:00-5:00 Report on NSSME session and discussion of topics for interest groups
- 5:00-?? **Reception**

Invitees and Participants

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Appendix A

Minutes of the 121st Meeting of the Council of the Conference Board of the Mathematical Sciences Alexandria, VA May 3, 2019

The following were present for all or part of the meeting, held at the ASA Headquarters.

Executive Committee: Diane Briars, Chair, William (Brit) Kirwan, Past-Chair; Charles Steinhorn, Secretary-Treasurer; Christine Thomas, Member-at-Large; Deanna Haunsperger, Member-at-Large

Council Members: James Ham, AMATYC; Jill Pipher, AMS; Mike Steele, AMTE; Ron Wasserstein (for Karen Kafadar), ASA; Charles Steinhorn, ASL (for Julie Knight); Dewey Gottlieb, ASSM; Ruth Haas, AWM; Jessica Utts, IMS (for Xiao-Li Meng); Taryn Lewis, INFORMS; Michael Dorff, MAA; Edray Goins, NAM; Mona Toncheff, NCSM; Robert Berry, NCTM; Lisa Fauci, SIAM; Jerry Brown, SOA; Nora Ramirez, TODOS.

Additional society representatives: Anne Dudley, AMATYC; Catherine Roberts and Karen Saxe, AMS; Timothy Hendrix, AMTE; Melissa Moore, INFORMS; Michael Pearson and Rachel Levy, MAA; Leona Harris, NAM; Connie Schrock, NCSM; Ken Krehbiel, NCTM; Eli Donkar, SOA

Invited Guests: Ted Coe, ACHIEVE; Karen King and Juan Meza, NSF; Kathie Bailey, Heidi Schweingruber, Michelle Schwalbe, and Amy Stephens, NAS; Kim Gattis, AIR; Katherine Leverenz, Mathematics Institute of Wisconsin; Michelle Blair, US Dept of Ed; Mark Loveland and Shandy Hauk, WestEd; Hyman Bass, University of Michigan; Judit Moschkovich, UCSC; Billy Williams, American Geophysical Union; Rebecca Nugent, Carnegie Mellon; Andrea Danyluk, ACM; Dan Heck, Horizon Research; C. David Levermore, University of Maryland.

Staff: David Bressoud, Kelly Chapman

Reports from the presenters are available at <https://www.cbmsweb.org/2017/12/cbms-council-meeting-december-7-2018/>

I. Opening Remarks

Chair Diane Briars welcomed those who were present and outlined the agenda.

II. Business Meeting

- 1. Secretary-Treasurer Report.** The minutes of the December 2018 CBMS Council meeting were approved unanimously. Charlie Steinhorn presented the FY 2019 half year financial report. The FY 2020 budget was approved.
- 2. Director's Report.** David Bressoud reported on the status of the CBMS/NSF Summer Research Conferences. Six conferences are scheduled for this summer. Summer 2019 is the last time that speakers can receive an honorarium for producing a monograph from the lectures. CBMS is currently preparing for the 2020 departmental survey. He also reported on preparation for the Pathways Forum. In addition, Officers and Directors insurance has been added since the last meeting.
- 3. MAA/CBMS Statement to House Education Committee.** A draft of this statement was included as appendix D.
- 4. Election of new officers.** Diane Briars, Brit Kirwan, and Francis Su served as the nominating committee. Their nominees were Dave Levermore who was unanimously elected as Chair-Elect and Edray Goins who was unanimously elected as Member-at-Large.
- 5. Announcements.**
 - Rachel Levy reported on the MSRI Critical Issues in Mathematical Education Conferences.
 - Karen Saxe reported briefly on what is happening in Washington with regard to issues of concern to the mathematical community, including the effect on NSF of the government shut-down, the appointment of Kelvin Droegemeier as Director of OSTP, and the immigration and visa threats. She also discussed the implications of the President's budget proposal.
 - Brit Kirwan talked about the current efforts of TPSE (Transforming Post-Secondary Education in Mathematics).

III. Reports and Discussion

1. Hy Bass and Judit Moschkovich discussed the recent NAS report on English Language Learners. Two of the strongest points made in the report are that we cannot wait until students are comfortable with English before teaching them mathematics and that it is a mistake to believe that initial emphasis should be on familiarizing these students with formal mathematical terminology
2. Billy Williams, VP for Ethics at the American Geophysical Union reported on the NAS report on Sexual Harassment. He talked about how common it is and how damaging are the forms of harassment that are less overt such unwanted sexual discussions, sexual insults, and offensive language. He laid out actions that societies can undertake such as policy statements, workshops on bystander interventions, an annual ethics summary, and a process for professional conduct self-disclosure.

This was followed up later in the meeting with a discussion of the Education Council's *Societies' Consortium to Address Sexual Harassment in STEMM*. Michael Pearson spoke of the significant legal work done by this organization. It was the sense of the participants that

there was no need for CBMS to duplicate this work. It was decided that those CBMS societies that are members of this consortium should share what they are learning with the other member societies

3. Dan Heck of Horizon Research introduced the recently released NSSME+ Report.
4. Shandy Hauk and Mark Loveland of WestEd reported on the latest iteration of the new Assessment Framework for the National Assessment of Educational Progress in Mathematics.
5. Andrea Danyluk and Rebecca Nugent talked about ACM efforts on building a data science program and the NAS report on Data Science in the Undergraduate Curriculum. An important take-away is that data science is intensely interdisciplinary, drawing on statistics, computer science, mathematics, and business. The NAS report describes what needs to be in a data science curriculum and describes sample courses and the pieces that can be included in other courses. It also makes the point that there are many possible routes through a data science curriculum that emphasize different competencies.
6. Diane Briars talked about concerns with the reviews of educational materials conducted by Ed Reports. She and Valerie Mills have put together a draft of a response to Ed Reports. She asked the CBMS society leaders to consider the draft.
7. There was a discussion of dealing with declining membership numbers and how institutional memberships should be counted in the dues calculation. No conclusions were reached.

Appendix B: FY 2019 Actual and FY 2020 Budget: fiscal year runs through Sept 30
FY 2018 Actual and FY 2019 Budget Shown for Comparison

Income				
	FY 2018 Actual	FY 2019 Budget	FY 2019 Actual	FY 2020 Budget
Dues	\$67,675	\$66,500	\$67,950	\$66,500
Interest	\$24	\$0	\$305	\$100
Royalties	\$601	\$2,000	\$5,000	\$1,000
NSF Regional Research Conferences				
Salaries	\$8,333	\$28,909	\$34,377	a \$29,865
Indirect Costs	\$2,917	\$4,313	\$7,636	b \$4,487
Forum 6				
Salaries			\$15,750	
Indirect Costs			\$13,478	
Other				
Total Income	\$79,551	\$101,722	\$144,496	\$101,952
Expense				
	FY 2018 Actual	FY 2019 Budget	FY 2019 Actual	FY 2020 Budget
Compensation				
Director	\$45,000	\$45,000	\$50,000	\$45,000
Administrative Coordinator	\$9,250	\$15,000	\$16,149	\$16,500
Postage and Shipping	\$460	\$300	\$210	\$500
Supplies	\$2,459	\$2,000	\$2,369	\$3,000
Internet			\$1,381	
QuickBooks license			\$645	
Website	\$380	\$260	\$556	\$600
Council Meetings				
Travel	\$5,002	\$7,500	\$9,129	\$7,500
Food and Other Meeting Expenses	\$11,972	\$12,000	\$9,202	\$12,000
Staff Travel	\$5,323	\$7,000	\$7,690	\$7,000
Dues and Subscriptions		\$500	\$0	
Accounting Fees	\$3,810	\$4,000	\$2,810	\$4,000
Auditing Fees		\$2,250	\$0	c \$2,250
USAMO Contribution	\$3,000	\$3,000	\$0	
Insurance	-			\$700
Bank Service Charges	-	\$120		
Unbudgeted Expenses				
Charitable contributions			\$300	
Total Expense	\$86,656	\$98,930	\$100,440	\$99,050
Operating Surplus or (Deficit)	-\$7,105	\$2,792	\$43,751	\$2,902

Notes

a - this includes salary for work in last quarter of FY2018 that we were not able to bill until FY2019

b - this is due to the large number of monographs published in 2019

c - These are only paid every third year. This is in anticipation of auditing fees of approximately \$6750 in FY 2020.

Appendix C

Unrestricted Net Assets as of September 30, 2019

unrestricted cash on hand	\$57,739
accounts receivable	
NSF	\$23,703
dues	\$700
other	\$950
accounts payable	\$0
Net	\$83,092

Investments

Vanguard Balance Sept 30, 2018	\$139,188
Vanguard Balance Mar 31, 2019	\$142,140
Vanguard Balance Sept 30, 2019	\$146,272
net gain	\$7,084
Total Unrestricted Net Assets	\$237,814

Appendix D

FY2020 dues assessment

Society	I=Interest	Dues Rounded	Change	Quarterly
AMATYC	1	\$1,100	-\$200	\$275
AMS	1	\$14,300	\$500	\$3,575
AMTE	1	\$600	\$100	\$150
ASA	0.5	\$5,400	\$0	\$1,350
ASL	0.5	\$400	\$0	\$100
ASSM	1	\$400	\$0	\$100
AWM	1	\$700	\$0	\$175
BBA	1	\$400	\$0	\$100
IMS	0.8	\$1,100	-\$100	\$275
INFORMS	0.5	\$3,600	\$0	\$900
MAA	1	\$5,800	\$0	\$1,450
NAM	1	\$400	\$0	\$100
NCSM	1	\$1,600	\$0	\$400
NCTM	0.6	\$11,700	\$400	\$2,925
SIAM	1	\$6,100	-\$200	\$1,525
SOA	0.5	\$13,800	-\$100	\$3,450
TODOS	1	\$400	\$0	\$100
WME	1	\$400	\$0	\$100
TOTAL		\$67,800		\$16,950

Half of dues assessment is based on Annual Revenue * Interest at \$0.31 per thousand dollars.
Half of dues is based on number of dues-paying U.S. members * Interest, \$0.46 per member
Dues assessments are either rounded to nearest multiple of \$100 or set at \$400, whichever is larger.

Appendix E

Director's Report

This past year has seen Kelly Chapman, my Administrative Coordinator and the person who has so effectively set up our office systems in Saint Paul, move on to graduate school. She is now working toward a Masters' degree and certification in elementary education at the University of Saint Thomas here in Saint Paul. Javon Barnes has stepped in to take her place and is off to a strong start.

This year saw a substantial operating surplus of over \$43,000. Just over \$29,000 of this was from salary and indirect cost reimbursements for the Forum. Roughly \$10,000 came from salaries and indirect costs for the CBMS/NSF Summer Research Conferences that should have been received in FY2018 but, because of a delay in funding, was not received until FY2019.

This was our first full year of funding the CBMS/NSF Summer Research Conferences under an NSF grant administered directly by CBMS. Details are given below.

This past year has been dominated by the Forum on *High School to College Mathematics Pathways: Preparing Students for the Future*, held May 5–7, 2019 at the Hyatt Regency in Reston, VA in collaboration with the Charles A. Dana Center of the University of Texas-Austin and Achieve. A full report, including the final budget are given below. We are currently planning for the follow-up Forum, to be held October 4–6, 2020, again at the Reston Hyatt.

We also successfully concluded our audit for fiscal years 2017, 2018, and 2019. As shown in **Appendix F**, we received a clean audit.

CBMS/NSF Summer Research Conferences.

This year six summer research conferences were held:

- *Mathematical Molecular Bioscience and Biophysics* led by Guowei Wei held at University of Alabama, Tuscaloosa
- *Topological Methods in Machine Learning and Artificial Intelligence* led by Gunnar Carlsson held at College of Charleston
- *L-functions and Multiplicative Number Theory* led by Kannan Soundararajan held at University of Mississippi
- *The Cahn-Hilliard Equation: Recent Advances and Applications* led by Alain Miranville held at University of Memphis
- *Fitting Smooth Functions to Data* by Charles Fefferman held at University of Texas, Austin

This was the last year in which NSF is paying for the production of a monograph. While the CBMS monograph series published under the auspices of AMS, IMS/ASA, and SIAM will continue, future authors will receive royalties rather than an honorarium. In exchange, we are now requiring much more extensive online materials, posted both before and after the conference. The lead lecturers will receive honoraria for preparing these online materials.

Largely because this was the last year in which a \$5000 honorarium is paid for the preparation of the monograph, we had a bumper crop. The following eleven monographs were published or accepted in 2019:

- Wen-Ching Winnie Li, *Zeta and L-functions in Number Theory and Combinatorics*, AMS #129
- Alice Guionnet, *Asymptotics of Random Matrices and Related Models: The Uses of Dyson-Schwinger Equations*, AMS #130
- Nalini Joshi, *Discrete Painlevé Equations*, AMS #131
- J.M. Landsberg, *Tensors: Asymptotic Geometry and Developments 2016–2018*, AMS #132
- Daniel S. Freed, *Lectures on Field Theory and Topology*, AMS #133
- David A. Cox, *Applications of Polynomial Systems*, AMS in production
- Qiang Du, *Nonlocal Modeling, Analysis and Computation*, SIAM #94
- Alain Miranville, *The Cahn-Hilliard Equation: Recent Advances and Applications*, SIAM #95
- Gunnar Martinsson, *Fast Direct Solvers for Elliptic PDEs*, SIAM #96
- Darren Crowdy, *Solving Problems in Multiply Connected Domains*, SIAM in production
- Alan E. Gelfand and Erin E. Schliep, *Bayesian Inference and Computing for Spatial Point Patterns*, IMS/ASA #10

The Forum on *High School to College Mathematics Pathways: Preparing Students for the Future*

The entire process began in Fall 2018 with a call for states to apply to participate in this CBMS project. Applications included the identification of a team of six to eight people representing leadership in mathematics education in the high school, two-year college, and university systems. They also included descriptions of existing relationships between these three types of institutions, state definitions of college readiness, relevant innovations currently in progress, and the leadership team's goals for their participation. Thirty-two states applied. We were able to accept 23 of the state teams. Several observers from Germany also attended

The selected teams were then asked to supply state-level student data. They also filled out a readiness assessment that asked about state-level leadership and commitment for articulation issues as well as the existence or development of policies addressing secondary to postsecondary mathematics alignment, postsecondary transfer, placement and advising, faculty professional learning, and data collection and evaluation.

In May 2019, the leadership teams plus a large group of observers were brought together for a three-day conference in which they were introduced to the resources, reports, and recommendations of professional societies in the mathematical sciences: the American Mathematical Society of Two-Year Colleges (AMATYC), the American Mathematical Society (AMS), the American Statistical Association (ASA), the Association of State Supervisors of Mathematics (ASSM), the Association of Mathematics Teacher Educators (AMTE), the Benjamin Banneker Association (BBA), the Mathematical Association of America (MAA), the

National Council of Supervisors of mathematics (NCSM), the National Council of Teachers of Mathematics (NCTM), the Society for Industrial and Applied Mathematics (SIAM), and TODOS–Mathematics for All. Participants were informed about ongoing work on the transition from high school to postsecondary mathematics in California, Illinois, Ohio, and Oregon. Most importantly, they began work with professionals from the Dana Center at the University of Texas at Austin to clarify the problem or problems they needed to address and to plan for next steps.

The teams were divided into cohorts of states at roughly the same level of development. Multiple state teams were placed in each breakout room, and we encouraged dialogue between teams. This was one of the most useful aspects of the conference as state teams learned what others at roughly the same stage of development were doing or considering doing, the obstacles they were facing, and their ideas for overcoming these obstacles.

In the month following the May conference, the leadership teams returned to their states to finalize their problem statement, identify the members of their larger task force, set the goals for the task force, and draft a timeline for its work. While the Forum proposed for October 2020 will work just with the leadership teams of six to eight people from each of the participating states, these form the core of the larger state task forces, representing all of the stake holders that are wrestling with identifying the critical problems that their state faces and formulating potential solutions.

Math Task Force Process At-A-Glance



Figure 1. *The progression of the process that the state task forces are undertaking.*

Since May, the leadership teams from four of the five cohorts have been checking in with Lindsay Fitzpatrick at the Dana Center on a quarterly basis with specific deliverables that are due each quarter (Figure 1). The fifth cohort—made up of Georgia, Indiana, Ohio, and Washington (state)—is working under the auspices of the Dana’s Center’s *Launch Years* project, developing new sequences of courses at the high school level. As Uri Treisman has described it,

Focusing on the critical junior-to-junior year timeframe, the Launch Years initiative puts forward a fundamentally new approach to mathematics. It maintains the rigor needed for postsecondary degrees and high-demand jobs, while also creating new pathways for significantly more students — including those traditionally underserved — to thrive in college and realize their dreams. (Treisman, 2019)

The states in all five of the cohorts are working toward the goal of providing a smoother articulation between high school and college mathematics. All of them are concerned about issues of equity and achievement gaps. Many are looking for new structures at the high school level that will articulate better with the pathways programs that have been built by a number of organizations, including the Carnegie Foundation for the Advancement of Teaching and the Dana Center. These programs are spreading throughout two- and four-year institutions, replacing traditional developmental mathematics.

All of the states are dealing with high rates of placement into developmental mathematics combined with high failure and low persistence rates in these courses. All of the states recognize that success in post-secondary education is a formidable equity issue. Students from traditionally underrepresented groups and from under-resourced public schools are less likely to succeed in college, and mathematics is often the chief stumbling block.

Among the challenges that individual states have identified are

- Uncertainties over appropriate placement procedures
- Lack of effective communication between secondary and postsecondary systems, including the lack of a common language for identifying and describing the problems
- Difficulties in accessing data and lack of transparency in how it is being used
- Working with limited resources and in a highly decentralized system
- Working within the constrictions of state mandates
- Ineffective instructional practices
- Uncertainties about the essential mathematical concepts that students need to master in high school
- Lack of clarity of the needs of business and industry
- Lack of stakeholder understanding of new pedagogies and curricula
- Uncertainty about how to measure success

The states that are represented in this work are

Cohort 1

- California
- Maryland
- Oregon
- Tennessee
- Virginia

Cohort 2

- Arkansas
- Kansas
- Missouri
- Nebraska
- Oklahoma

Cohort 3

- Alabama
- Iowa
- Maine

- Massachusetts
- Wisconsin

Cohort 4

- Arizona
- Idaho
- Minnesota
- Utah

Cohort 5

- Georgia
- Indiana
- Ohio
- Washington

This has been an expensive undertaking, as the budget on the next page makes clear.

Budget for the CBMS Forum on High School to College Mathematics Pathways

Revenue		Received	Outstanding	Total
Grants	Carnegie	\$176,800	\$13,200	\$190,000
	Teagle (rec'd in FY2018)	\$47,000		\$47,000
	Pearson	\$6,000		\$6,000
	TI	\$18,000		\$18,000
	NSF	\$99,825		\$99,825
	Dana Center	\$4,967		\$4,967
		\$352,592	\$13,200	\$365,792
Other	Individual registrations	\$3,600		\$3,600
		\$361,159	\$13,200	\$369,392
Expenses		Paid	Outstanding	total
Staff Time	Dana Center	\$90,000	\$30,000	\$120,000
	MAA Staff	\$319	\$0	\$319
	David Bressoud	\$7,500	\$0	\$7,500
	Kelly Chapman	\$8,250	\$0	\$8,250
	Stephanie DeJong	\$300	\$0	\$300
Postage	\$186	\$0	\$186	
Supplies	Printing	\$1,231	\$0	\$1,231
	Videographer	\$9,574	\$0	\$9,574
Travel Reimbursements	Planning Mtgs	\$13,265	\$0	\$13,265
	Committee & Speakers	\$18,829	\$0	\$18,829
Hotel - Rooms	Committee & Speakers	\$17,147	\$0	\$17,147
	States	\$54,756	\$0	\$54,756
Hotel - Food		\$75,433	\$0	\$75,433
Hotel - AV		\$22,959	\$0	\$22,959
Honorarium Alan Schwarz		\$1,500	\$0	\$1,500
Indirects	Carnegie	\$9,130	\$0	\$9,130
	NSF	\$4,348	\$0	\$4,348
preparation and dissemination of report		\$0	\$4,665	\$4,665
		\$334,727	\$34,665	\$369,392

The 2020 Forum on *High School to College Mathematics Pathways: Supporting State Efforts*

We are now in the process of planning for the successor Forum that will bring the 23 state teams back together to share challenges and successes and assist them in continuing to move forward. We have reserved the Hyatt Regency, Reston for October 2–4, 2020. Grace Suh, Vice-President for Education at IBM and Maria Echaveste, President and CEO of the Opportunity Institute have agreed to be our keynote speakers. Grace Suh will speak following lunch on Monday and is interested in staying for the entire Forum. Peter Ewell, former President of NCHEMS has agreed to serve as our evaluator and one of the people who will comment on his observations during the concluding panel session.

We expect a total cost of around \$300,000. So far, we have a commitment of \$20,000 from Texas Instruments and a tentative indication of \$50,000 from the Carnegie Corporation of New York. There are encouraging signs that the Gates Foundation will contribute \$75,000. In addition, we have submitted a request for \$155,000 to NSF DUE IUSE (#2005120).