May 1, 2022

Dear Profs. Brown, Knowlton, Sorapure,

We write to you in your current capacities as Chair and Vice Chair of BOARS, and EVP for Academic Affairs at the UCOP. We, the authors of this letter, represent a significant majority of black faculty across the UC system in fields related to data science (mathematics, statistics, and electrical engineering/computer science), and we feel compelled to speak up given the harm that the recent California Math Framework and certain new UC policies may have on our Californian students, and especially on students of color.

As you may know, in 2019 the California State Board of Education approved a timeline to revise the California Math Framework ("CMF") for K-12 math education throughout our state. The first version of the CMF draft was released in early 2021 for public comment. Later that year, in December, a team of four STEM experts penned an [open letter](#) critiquing the CMF on the grounds that it lowers the standards for statewide mathematics. In particular, it would move us away from equitable math education since those parents with resources would be able to navigate around some of the changes suggested in the CMF draft for their own children to get ahead.

The letter has received over 1700 signatures from STEM experts around the country, with over 150 being STEM faculty from across the University of California system, and many more signatures from our system's staff, students, and alumni. Signatories included 7 Nobel Prize winners, 5 Fields Medalists (the "Nobel Prize of math"), 5 MacArthur "Genius" Fellows, and 3 winners of the Turning Award (the "Nobel Prize of computer science"), as well as several UC staff who have devoted their careers to improving equity, including:
- **Fatima Alleyne**, Director of Community Engagement and Inclusive Practices in the College of Engineering, UC Berkeley
- **Lizzie Hager-Barnard**, Director of K-12 Outreach for the College of Engineering, UC Berkeley
- **Ira Young**, Director of STEM Excellence through Equity & Diversity (SEED) Scholars Honors Program, UC Berkeley

In particular, at that time the CMF proposed that no students should be allowed to take Algebra I until 9th grade, a measure tried in San Francisco that was easily circumvented by parents with resources who could simply [pay for their children to take a course on the subject over the summer](#). In addition, the CMF proposed a new "Mathematics: Investigating & Connecting" ("MIC") pathway as an alternative to the existing "traditional" Algebra I, Geometry, then Algebra II pathway, or to the existing "integrated" pathway which blends the different areas of math across three years. In addition to advocating for certain pedagogical shifts, the new MIC pathway attempts to incorporate more data literacy and data science into math education, and

points to our own UC Area C requirements being modified to allow data science courses. Oddly, despite this emphasis on data science, the CMF draft writing team contains no data science expertise.

While revision 2 of the CMF has toned down its language on not having 8th grade Algebra I, the MIC pathway remains largely unchanged. Some of the data science courses already approved by UC have even been approved as honors courses and as also satisfying the Area C Algebra II requirement, such as [Introduction to Data Science](#) ("IDS"), despite not satisfying a single one of the non-statistics [California Common Core standards](#) for Algebra II and not satisfying [most of the requirements for honors as put forward by BOARS](#). Courses such as IDS cannot validate Algebra II according to [Academic Senate regulations](#) (specifically items 424 and 428; note that IDS cannot count as a "more advanced course" under Academic Senate regulations since it does *not* assume knowledge from Algebra II – a simple word search through the textbook shows that concepts such as "exponential", "logarithm", or even "cosine" do not appear once).

Such courses are off-ramps from pre-calculus and calculus, and thus off-ramps from many STEM degrees, ironically including even data science degrees: every UC campus offering a data science degree requires at least multivariable calculus to graduate, except for one campus which requires only single variable calculus. This course and others like it also [make claims](#) that they specifically support learning for women and minorities, which are not only baseless but fail to appreciate that they actually do the opposite and harm students from such groups by steering them away from being prepared for STEM majors, as mentioned above.

Approval of such courses also undermines efforts by UC faculty to improve diversity and equity by making students coming into the UCs very underprepared for our courses. Such efforts include the [SEED program](#) at UC Berkeley, which requires completion of calculus in high school, and efforts to increase the numbers of black students pursuing advanced careers in the mathematical sciences such as the [David Harold Blackwell Summer Research Institute](#) and [Black in AI](#).

We stress that we are *not* stating that data science cannot be meaningfully injected into the K-12 curriculum in a way that satisfies our A-G requirements. Rather, such approval must be done with care, on a course by course basis, to make sure that content standards are fully met, which does not seem to be the case for many courses that have already been approved by our processes. A new [open letter](#) published just this week already has nearly 400 signers from faculty across Californian universities, a number that has been growing rapidly, stressing the importance of math preparation for a career in data science. Signatories include data science leadership in our state's academe, such as both the Dean and Associate Dean of Computing, Data Science and Society (Jennifer Chayes and John DeNero at UC Berkeley), Director of the Foundations of Data Science Institute (Peter Bartlett at UC Berkeley), the Founding Director and another Founding Faculty of the Hacıoğlu Data Science Institute (Rajesh Gupta and Todd Kemp at UCSD), the Faculty Director and an Associate Chair of the Stanford Data Science Institute

(Emmanuel Candes and Chiara Sabatti), and many other faculty who teach and do research in data science.

We call on BOARS and the UCOP leadership to act in two ways:

- Acknowledge the widespread UC systemwide concern with the CMF as seen in the [open letter](#) and the new [MathInDataMatters letter](#), and make an official UCOP statement to publicly express concerns with the CMF that are held by so many of our UC faculty.
- Ensure that UC faculty with data science expertise are a part of the process to approve all data science courses, and also have such faculty review data science courses that have already been approved for possible revocation of approval status if content standards are found to not have been met. Such a set of faculty must include representatives from not only mathematics and statistics as was historically the core of Area C, but also computer science, which plays a central role in data science. The field of data science is in its early stages and so no official widely-recognized content standards exist, making it all the more essential that faculty with expertise are involved in such judgments.

Sincerely,

Adebisi Agboola, Professor, Department of Mathematics, UC Santa Barbara
Wilfrid Gangbo, Professor, Department of Mathematics, UCLA
Ian Harris, Professor, Department of Computer Science, UC Irvine
Boubacar Kante, Chenming Hu Associate Professor, Department of EECS, UC Berkeley
Imani Munyaka, Assistant Professor, Department of Computer Science, UCSD
Ndapa Nakashole, Assistant Professor, Department of Computer Science, UCSD
Jelani Nelson, Professor, Department of EECS, UC Berkeley
Maxime Pouokam, Lecturer, Department of Statistics, UC Davis