



# Building a virtual community to support and celebrate the success of Latinx scientists

Brian A. Aguado<sup>1</sup>✉ and Ana M. Porras<sup>2</sup>✉

In February 2019, we co-founded LatinXinBME to build a diverse and welcoming virtual community of Latinx researchers in biomedical engineering (BME). We leverage digital tools and community mentoring approaches to support our members and to build safe spaces in academia, with the aim to diversify the academic workforce in STEM.

## Underrepresentation in STEM

Latinx researchers continue to be underrepresented, excluded and marginalized in all science and engineering disciplines, and often lack the necessary community and support at their institutions to succeed academically. The latest US census data<sup>1</sup> suggests that 18.5% of the total population in the USA is Hispanic or Latinx; however, this level of representation is not achieved in the academic community. According to the 2018 Engineering by the numbers report from the American Society for Engineering Education, approximately 10.2% of Bachelor's degrees, 3.8% of Master's degrees and 2.6% of Doctoral degrees in engineering fields are awarded to Latinx students<sup>2</sup>. Furthermore, as of 2016, only 587<sup>3</sup> of 27,412<sup>2</sup> tenured or tenure-track engineering faculty are Latinx in the USA, out of which only 48 were born in the USA<sup>3</sup>.

The causes of low Latinx representation at all academic levels in STEM are multivariate. Unequal access to education and health care, immigration barriers, family expectations, discrimination, feelings of isolation and perceptions of Latinx students as 'low performing' all contribute to poor recruitment and retention of Latinx trainees and faculty members<sup>4</sup>. Additionally, Latinx researchers at all career levels often do not have appropriate role models to 'see' themselves in influential positions in STEM owing to the low likelihood that their peers and senior mentors are also Latinx. Thus, receiving mentorship and support is critical for Latinx trainees and aspiring faculty members to be successful in academia<sup>5</sup>.

To address this problem, we co-founded LatinXinBME in February 2019 — a community that leverages digital tools to support Latinx scientists and engineers in biomedical engineering (BME) at all career stages and promotes diversification and inclusion in the BME workforce.

## Building the LatinXinBME community

**Slack.** We chose the Slack messaging application to build our [LatinXinBME Slack community](#) (FIG. 1a), inspired by similar communities, such as [New PI Slack](#) and

[Future PI Slack](#). Slack has the advantage to create channels centred around specific topics, centralize information relevant to the community, initiate private messages between members and engage Latinx BMEs across time zones and locations. The most active channels in our Slack community fit into a few categories: careers (for example, #industry-jobs, #academic-jobs), mentoring (for example, #undergrad-to-grad), mental health (for example, #highsandlows) and issues that impact Latinx communities (for example, #immigration-woes). The channel conversations ensure that members receive the mentorship they need to be successful in their next career steps.

Since our founding, we have recruited 175 members on Slack (FIG. 1b). LatinXinBME members include 12 different Latin American nationalities and a variety of BME sub-disciplines, including biomechanics, biomaterials, tissue engineering, regenerative medicine, imaging, neural engineering, drug delivery and microfluidics. Our recruitment strategy first relied on reaching out to our immediate Latinx friends and colleagues. To maintain growth, we consistently promote our group at conferences and seminars, rely on non-Latinx allies to spread the word, and reach out to prospective members. New members first enter our Slack space through the #introductions channel, where they are welcomed by the community and where they can begin to interact with others with similar interests. Out of 57 surveyed members, 9% are undergraduate students, 56% are graduate students, 17% are postdoctoral fellows, 11% are assistant professors, 5% are associate or full professors with tenure and 2% are members with industry careers (FIG. 1c).

**Twitter.** Our community is active on Twitter (@LatinXinBME), where we highlight our members and their professional successes, advertise job openings, internship opportunities and professional development workshops, and share resources to support diversity, equity and inclusion. For example, we leverage national events, such as the Hispanic/Latinx Heritage Month

<sup>1</sup>Department of Chemical and Biological Engineering, BioFrontiers Institute, University of Colorado Boulder, Boulder, CO, USA.

<sup>2</sup>Department of Biomedical Engineering, Cornell University, Ithaca, NY, USA.

✉e-mail: [brian.aguado@colorado.edu](mailto:brian.aguado@colorado.edu); [amp428@cornell.edu](mailto:amp428@cornell.edu)

<https://doi.org/10.1038/s41578-020-00259-8>

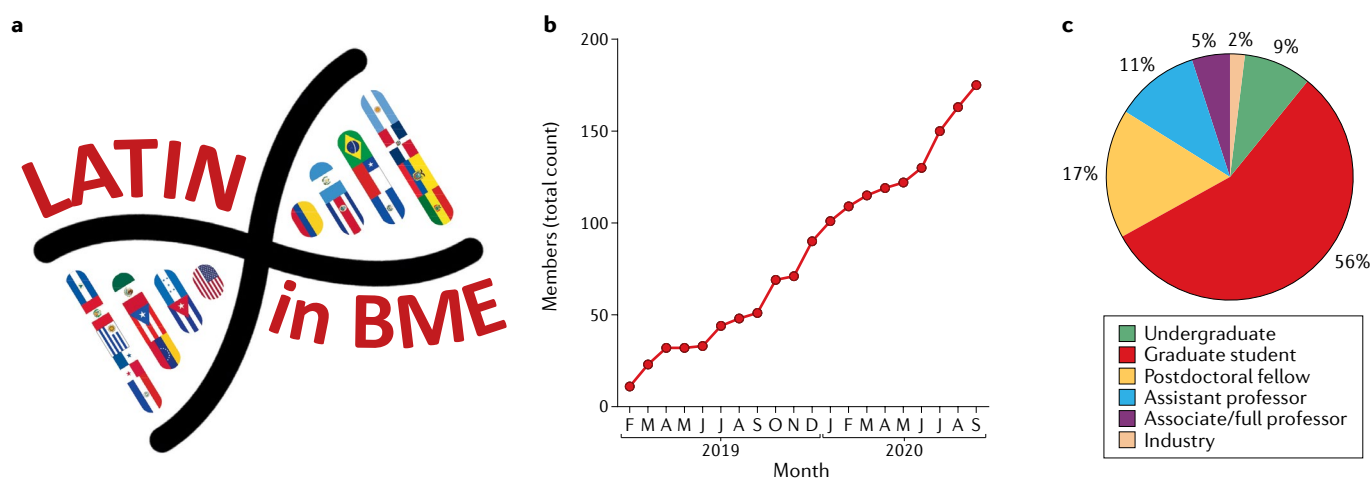


Fig. 1 | **LatinXinBME.** (a) The LatinXinBME logo showcases flags from Latin American countries intertwined to mimic the DNA helix structure. (b) Cumulative number of members of the Slack LatinXinBME channel since February 2019. (c) Percentages of surveyed members identifying with a specific career level.

(annually from September 15 to October 15), to highlight our current members and encourage new members to join. Additionally, Twitter allows us to interact with other organisations and leaders dedicated to expanding diversity in STEM. For example, to promote multilingual science communication<sup>6</sup>, LatinXinBME collaborates with the [Tissue Engineering and Regenerative Medicine International Society \(TERMIS\)](#), [Student and Young Investigator Section \(SYIS\)](#) to post weekly tweets that list English-to-Spanish translations of vocabulary related to types of biomaterials, cell culture, materials chemistry and characterisation techniques.

### Community-building and mentoring

**Virtual events.** The LatinXinBME community is spread out across the world (albeit most members are in the USA) and thus, we rely on technology to keep the community connected. We host professional development events, including virtual writing groups, one-on-one meetings and Q&A sessions discussing interviews for graduate school as well as regular social mixers.

**In-person events.** The LatinXinBME community hosts in-person networking events to complement our virtual programmes and to provide an opportunity to get to know each other as friends and colleagues through informal activities, such as dinners. These events often spontaneously turn into mentoring, brainstorming or listening sessions. LatinXinBME members have organized networking events at the [Society for Biomaterials \(SFB\) Annual Meeting](#), the [Biomedical Engineering Society \(BMES\) Annual Meeting](#), the [Gordon Research Conferences](#), the [Cell and Molecular Bioengineering Conference](#), the [American Association for the Advancement of Science Annual Meeting](#), and the [Society for Advancement of Chicanos/Hispanics and Native Americans in Science Diversity in STEM conference](#).

**Addressing Latinx-specific issues.** The Slack platform provides spaces for reflection to analyse and discuss academic and societal issues specific to our Latinx

community through the lenses of our cultures, intersecting identities and lived experiences. For example, constant changes in US immigration policies negatively impact our members and have spurred virtual conversations in which to vent about the situation and develop action items, including contacting local representatives. After the murders of George Floyd, Breonna Taylor, Elijah McClain and countless other Black citizens at the hands of law enforcement, we discussed the [#BlackLivesMatter](#) movement and how to support anti-racism practices, and how to best engage our Latinx family, friends and colleagues in this cause.

**Advocacy efforts.** Part of our mission is to advocate for the inclusion, support and well-being of all LatinXinBME scholars at local and national levels. Our members have participated in various efforts to advocate for diversity and inclusion in their departments and they engage with their local Latinx communities. On a national level, we — the LatinXinBME co-founders — served on the SFB Diversity Task Force to help establish the new [Society for Biomaterials Diversity, Equity and Inclusion Committee](#). We are also hosting a virtual panel session at the [BMES 2020 Annual Meeting](#) with support from the [Biomedical Engineering Society Diversity Committee](#) to highlight research conducted by Latinx in BME and to provide a space for attendees to learn about experiences of marginalized early-career biomedical engineers.

### Call to action

**Build your own community.** The goals and strategies of LatinXinBME transcend fields and disciplines. Although our focus is to support the BME Latinx community, we believe this framework can be used to create spaces for other communities that are historically excluded and underrepresented in STEM. Similar virtual communities, such as [@LatinXChem](#), [@GeoLatinas](#) and [@BlackInEngineering](#), have also been successful at building virtual spaces for marginalized groups in STEM and in providing remote mentorship opportunities to trainees.

**Allyship.** We encourage our non-Latinx colleagues to engage with us, learn from our experiences and understand the systemic barriers that drive the underrepresentation of Latinx in BME. Allies must recognize the pool of talent present within our community, recruit students, postdocs, staff and faculty, and create and fund programmes that foster the representation, growth and success of Latinx and other marginalized groups in STEM. Faculty in influential positions must take an active role in diversifying undergraduate and graduate admissions (for example, by eliminating the use of standardized tests such as the Graduate Record Examination<sup>7</sup>, by providing application fee waivers and by building meaningful relationships with Hispanic-serving institutions, historically Black colleges and universities, and Tribal colleges and universities). Faculty and deans must also commit to bold efforts when hiring faculty (for example, cluster hiring for tenure-track professors, expanding recruitment pools and reassessing of hiring criteria).

However, recruiting alone will not fix the deep inequities that permeate STEM and higher education. Ensuring equal opportunity is crucial at the individual level (for example, inviting underrepresented colleagues to give talks, collaborating on grants and co-authoring manuscripts) and on an institutional level (for example, redefining graduation, hiring and promotion criteria to recognize diversity, equity and inclusion efforts, which are often ignored in performance evaluations).

Colleagues must also create welcoming and safe work environments and help stop racist behaviours that infect the STEM community and leave the Latinx community powerless. Stop assuming that the Latinx scientist down the hall is the janitor. Stop joking that Latinx scientists are good at making cocaine in the lab. Stop mentioning that accents are distracting in presentations. Stop thinking that Latinx immigrants are stealing jobs. Stop saying that we were awarded a fellowship because we are Latinx.

**Outcomes.** Although our organization is young, we are already seeing positive effects. We have mentored undergraduate students through two academic admissions cycles. Several of our graduate student members have asked for feedback on fellowship applications and have been awarded National Science Foundation Graduate Research Fellowships and other awards. In the faculty recruitment cycle for 2019/2020, three of our postdoctoral LatinXinBME members, mentored by other members of the community, secured faculty positions, indicating that our efforts may help future postdoctoral fellows pursue an academic career. Faculty have been able to share resources and invite each other to their department seminar series. Our virtual community has also provided much needed support during the COVID-19 pandemic.

## Closing thoughts

LatinXinBME has filled a void in our field by connecting Latinx biomedical engineers, countering feelings of institutional isolation and exclusion, and fostering inclusion in the broader scientific community. As showcased by our preliminary outcomes, our approaches could help increase the representation and success of Latinx scholars in academia. However, we will not achieve this goal without commitment and actions at higher levels of academic leadership. We will continue to counteract Latinx stereotypes and increase awareness of the talent within our community. We are optimistic that our efforts may one day lead to a STEM workforce that reflects the rich diversity of our global neighbourhoods and ensures that everyone who wants to practice science feels welcomed, included and valued.

1. United States. Bureau of the Census. Geography Division. (U.S. Census Bureau, Washington, D.C., 2010).
2. Roy, J. Engineering by the numbers. *Technical Report, American Society of Engineering Education* (2018).
3. Arellano, G. N., Jaime-Acuña, O., Graeve, O. A. & Madsen, L. D. Latino engineering faculty in the United States. *MRS Bulletin* **43**, 131–147 (2018).
4. Muñoz, J. A. & Villanueva, I. Latino STEM scholars, barriers, and mental health: a review of the literature. *J. Hispanic High. Educ.* <https://doi.org/10.1177/1538192719892148> (2019).
5. National Academies of Sciences, E. & Medicine. *The Science of Effective Mentorship in STEMM*. (The National Academies Press, 2019).
6. Márquez, M. C. & Porras, A. M. Science communication in multiple languages is critical to its effectiveness. *Front. Commun.* <https://doi.org/10.3389/fcomm.2020.00031> (2020).
7. King, M. R., Jennings, G. K., Chalkley, R. G. & Sealy, L. J. Questioning the value of the graduate record examinations (GRE) in PhD Admissions in biomedical engineering. *Ann. Biomed. Eng.* **48**, 2155–2157 (2020).

## Acknowledgements

We abundantly thank all our LatinXinBME members and allies, as this work would not be possible without your enthusiasm and engagement. B.A.A. acknowledges funding from the NIH (K99 HL148542) and the Burroughs Wellcome Fund Postdoctoral Enrichment Program. A.M.P acknowledges funding from the Cornell Presidential Fellows Program.

## Competing interests

There is no competing interest.

## RELATED LINKS

American Association for the Advancement of Science: <https://www.meetings.aaas.org/>  
 Biomedical Engineering Society: <https://www.bmes.org/>  
 Biomedical Engineering Society Annual Meeting: <https://www.bmes.org/annualmeeting>  
 Biomedical Engineering Society Diversity Committee: <https://www.bmes.org/diversity>  
 Black in Engineering: <https://www.blackinengineering.org/>  
 Cell and Molecular Bioengineering Conference: <https://www.bmes.org/2020cmbecof>  
 Future PI Slack: <https://futurepislack.wordpress.com/>  
 GeoLatinas: <https://geolatinas.weebly.com/>  
 Gordon Research Conferences: <https://www.grc.org/>  
 LatinXChem: <https://www.latinxchem.org/>  
 LatinXinBME Slack community: <https://www.latinxinbme.slack.com>  
 LatinXinBME Twitter: <https://twitter.com/LatinXinBME>  
 New PI Slack: <https://newpislack.wordpress.com/>  
 Society for Advancement of Chicanos/Hispanics and Native Americans in Science: <https://www.sacnas.org/>  
 Society for Biomaterials: <https://biomaterials.org/>  
 Society for Biomaterials Diversity, Equity and Inclusion Committee: <https://biomaterials.org/committees-committees-overview/diversity-equity-inclusion-committee>  
 Tissue Engineering and Regenerative Medicine Society, Student and Young Investigator Section: <https://www.termis.org/termis-syis-am>