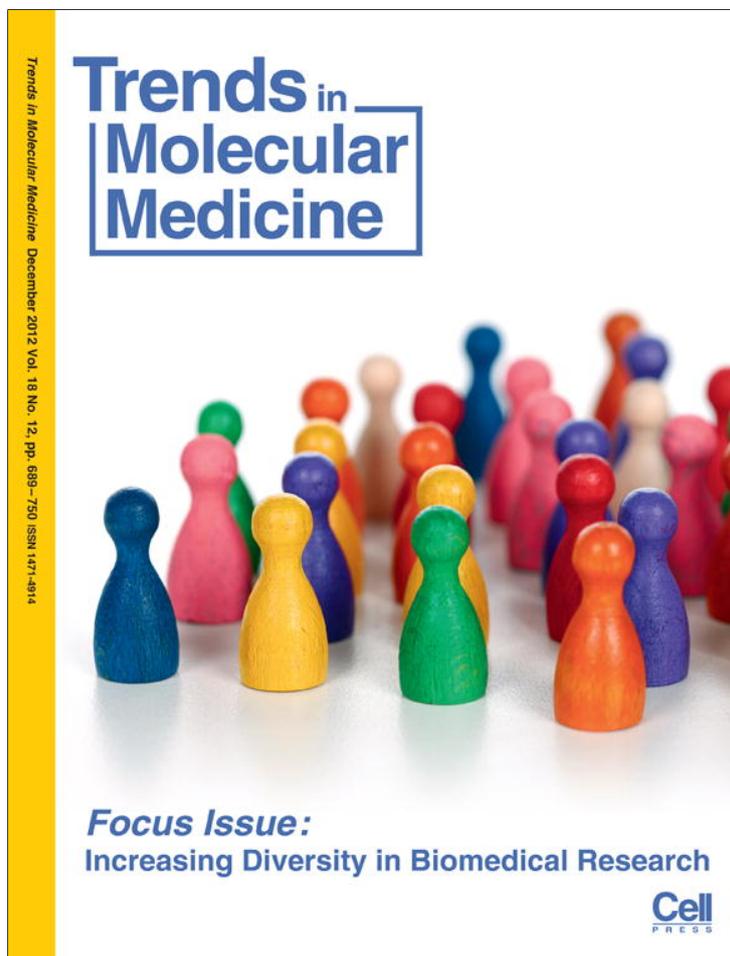


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excellent resource to extend these collaborations around the world. The possibility of potential partnerships between CIRM and African governments will further accelerate biomedical research on the continent and make personalized therapies, including those developed from iPSCs, a reality in Africa.

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## Taking diversity programs to the next level

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**The Keystone Symposia Fellows Program is a unique and diverse research mentoring and positioning program tailored for 'end of the pipeline' scientists and can successfully enhance career advancement. Major program components include mentoring by well-established global science leaders and exposure to high-level discussions and decision making on future research priorities.**

During the past decade, discussions at annual conferences on diversity in life science programs and activities have often raised the question 'What design should be used in the next stage of evidence-based mentoring programs for advanced level underrepresented minority (URM) scientists?' Specifically, what mentoring activities and positioning programs that focus on early career scientists (i.e., postdoctoral fellows, assistant professors, and industry

scientists at equivalent levels) are indicated? The overwhelming majority of life science and STEM diversity program activities in the recent past have focused on earlier stages: high school and undergraduate mentoring and experience activities, programs that promote enrollment and retention of students in undergraduate and doctoral level degree programs, scholarships to scientific conferences for undergraduate and graduate students, and mentoring at these early stages [1]. The Keystone Symposia Fellows Program was conceived and initiated to address the need for a program focused on the early career development of life scientists from both underrepresented and majority backgrounds.

#### Keystone Symposia Fellows Program

Keystone Symposia on Molecular and Cellular Biology is a life science research and education conference organization committed to accelerating life science discovery and connecting the life science community, primarily by organizing life science research and education conferences. It

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fosters high-level scientific inquiry by developing its 55–60 annual meeting programs using a strong peer review model, and the organization continues to garner substantial respect and recognition as a major venue for the development and training of life scientists—especially the next generation [2].

Given its rich history in training scientists and the expertise of its scientists Board of Directors and Scientific Advisory Board, Keystone Symposia recognized that it could play a major role in enhancing participation by scientists from underrepresented backgrounds and those who are women. The model underpinning Keystone Symposia's Diversity in Life Science Programs is future-focused and forward-thinking. It recognizes the need to increase interactions between scientists in academia and scientists in industry, as well as the need to educate scientists and train them how to take advantage of opportunities available in both environments. The model is ambitious in its desire to provide access and exposure to mentoring, global research talent and the need to mentor underrepresented scientists and women at more advanced levels to achieve success in research.

The Diversity in Life Science Programs initiatives include a scholarship program for graduate students and postdoctoral scientists; an Early Career Investigator Travel Award program for scientists who have a specific research question that they and the scientists organizing the conference believe can be answered during a specific meeting; Peer-2-Peer mentoring session at scientific meetings; an outreach to cell and molecular biology departments at academic institutions; and the Fellows Program.

The Fellows Program aims to perpetuate 'behind-the-scenes' knowledge of the scientific community among the next generation of scientists, by providing valuable mentoring resources for URMs. In particular, it positions and trains early career scientists who must demonstrate a depth of knowledge regarding the complexity of diversity within the research community. This year-long program is nonresidential and research oriented. By shadowing scientist organizers and key Keystone Symposia staff, the Fellows Program provides context, understanding, and insight into the development of high quality research meetings. With a focus on diversity, it educates early career scientists on the inner workings of the life sciences community and provides a venue for high-level interactions with established, globally recognized leaders in life science research.

To develop its conferences, Keystone Symposia relies on a 75-member Scientific Advisory Board (SAB) consisting of leading scientists from academia, government, and industry. The responsibilities of the SAB fall into two areas: brainstorming emerging research topics and peer review. For the former, each January the SAB meets to identify issues and opportunities that might be addressed in future scientific meetings and to select organizers and speakers. Subsequently, these organizers develop meeting proposals for conferences two years into the future. The second major activity of the SAB is to peer review these proposals at a June meeting and select a final set of topics for the future meeting schedule. This shadowing experience allows Fellows to learn how the research agenda is set, how to

engage in discourse on research topics, and how to broaden perspectives in life science research. Such experiences are often not available to URM scientists, and the rationale for the Program is that the activities of the SAB faithfully mirror the discussions and decision-making taking place throughout the life science research community. Through their own subsequent mentoring activities, this growing Fellows community can pass on their 'behind-the-scenes' knowledge to the next generation of scientists. Furthermore, these Fellows will have a greater understanding of the complex issues surrounding diversity in the life sciences as well as a commitment to encouraging diverse perspectives. The Fellows experience, combined with their awareness of the needs of URM scientists, will enhance the effectiveness of their laboratory programs, research, and mentoring efforts.

### Program Design

After recognizing the potential to positively affect early careers, Keystone Symposia developed, applied for, and received an NIH MARC grant, which is managed by the Director of Diversity in Life Science Programs. The Fellows Program began in 2008 with an overarching goal to share the SAB experience of high level conference development with early career investigators. The membership of a Fellows class includes scientists from both the majority and underrepresented populations.

We hypothesized that exposure to these activities will better position the Fellows for success in their research and career. The principal selection criteria are (i) achievement in research, (ii) documented commitment to increasing participation in life science research by nationally designated underrepresented populations (African American, Hispanic/Latino, Native American/Alaska Native, and Native Hawaiian/Pacific Islander), and (iii) the development of a well thought-out research career plan. The Program has several major activities: structured communications and mentoring with senior staff, mentoring by SAB scientists via coordinated pairing, participation in the SAB meetings, written exercises, participation in online discussion with invited scientists to brain storm the next research topics in a given research area, participation in a half-day mentoring session with a recognized scientist facilitator chosen to match the Fellows' needs, oral presentation to the SAB highlighting their research and perspectives on inclusion, and regular opportunities for reflection.

### Outcomes and Conclusions

With a half decade of quantitative data there is evidence of program success (Table 1). More than three-quarters of the Fellows had documented enhancement of their career as a direct result of participation in the Fellows program, such as professional advancement, invitations to present at a national/international conference or laboratory, offers or acceptance of a new position, research collaborations, funding of a new research grant, or publication collaboration.

Questionnaires completed by Fellows, staff, and SAB members, as well as anecdotal observations, suggest that the qualitative outcomes of the Fellows Program are also

**Table 1. Keystone Symposia Fellows Program Metrics**

	Totals	Percent
<b>Ethnicity<sup>a</sup></b>		
African American/Black	9	39%
American Indian/Alaska Native	2	9%
Bi-Cultural	1	4%
Hispanic or Latino	9	39%
Pacific Islander	1	4%
White/European American	1	4%
<b>Gender<sup>a</sup></b>		
Female	14	61%
Male	9	39%
<b>Age Group<sup>a</sup></b>		
25–29	2	9%
30–34	12	52%
35–39	8	35%
40–44	1	4%
<b>Starting Career Stage<sup>a</sup></b>		
Assistant Professor	10	43%
Postdoctoral Fellow	9	39%
Research Scientist	4	17%
<b>Post Program Career Stage<sup>b</sup></b>		
Assistant Professor	9	50%
Research Scientist	4	22%
Postdoctoral Fellow	2	11%
Research Scientist II	1	6%
Scientific Administrator	1	6%
Program Manager	1	6%
<b>Career Enhancement<sup>b</sup></b>		
Yes	15	83%
No	3	17%

<sup>a</sup>Data represents Fellows Program years 2009–2013 (N=23).

<sup>b</sup>Data represents Fellows that completed the Program 2009–2012 (N=18).

significant: new career-enhancing opportunities, an understanding of how small scientific meetings serve to advance career trajectories, a detailed understanding of decision-making and how research agendas are set at the highest levels, and, more generally, insight into the ways both

research and career can be advanced by deliberate, proactive attention to targeted networking and communication. Lastly, this model contributes to society through the mentoring, training, and preparation of the next generation of scientists.

### Implications

The Keystone Symposia Fellows Program is unique in its focus on scientists at the 'end of the pipeline' and its positioning for career success. Why are programs focused on enhancing diversity so critical to our nation and scientific research? We know from various studies that having different, more diverse perspectives focused on a task, piece of research, or goal brings about greater problem-solving capability [3]. For the most efficient, effective use of our limited resources we must have the benefit of perspectives from our entire population in tackling the research and disease challenges our nation faces. Given the ongoing demographic changes, if the US is to maintain its prowess in life science research it is critical that we mentor, train, and include the 'best and the brightest' both from majority and underrepresented populations. This is an issue of access as well as mentoring and training. The need exists for providing early career scientists access and exposure to well established research scientists, models for effective research career success, connections and collaboration. The Keystone Symposia Fellows Program satisfies this scientific community need and has a proven track record of success.

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