



Yale Partnerships for Global Health

a multi-lateral model for biomedical research training



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Program in Pediatric Global Health
Yale School of Medicine
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Yale and the World

“Yale’s effort to internationalize will be one of the key institutional priorities for this decade”



**Richard C. Levin
President 1994-2014**



Yale Partnerships for Global Health 2007-present

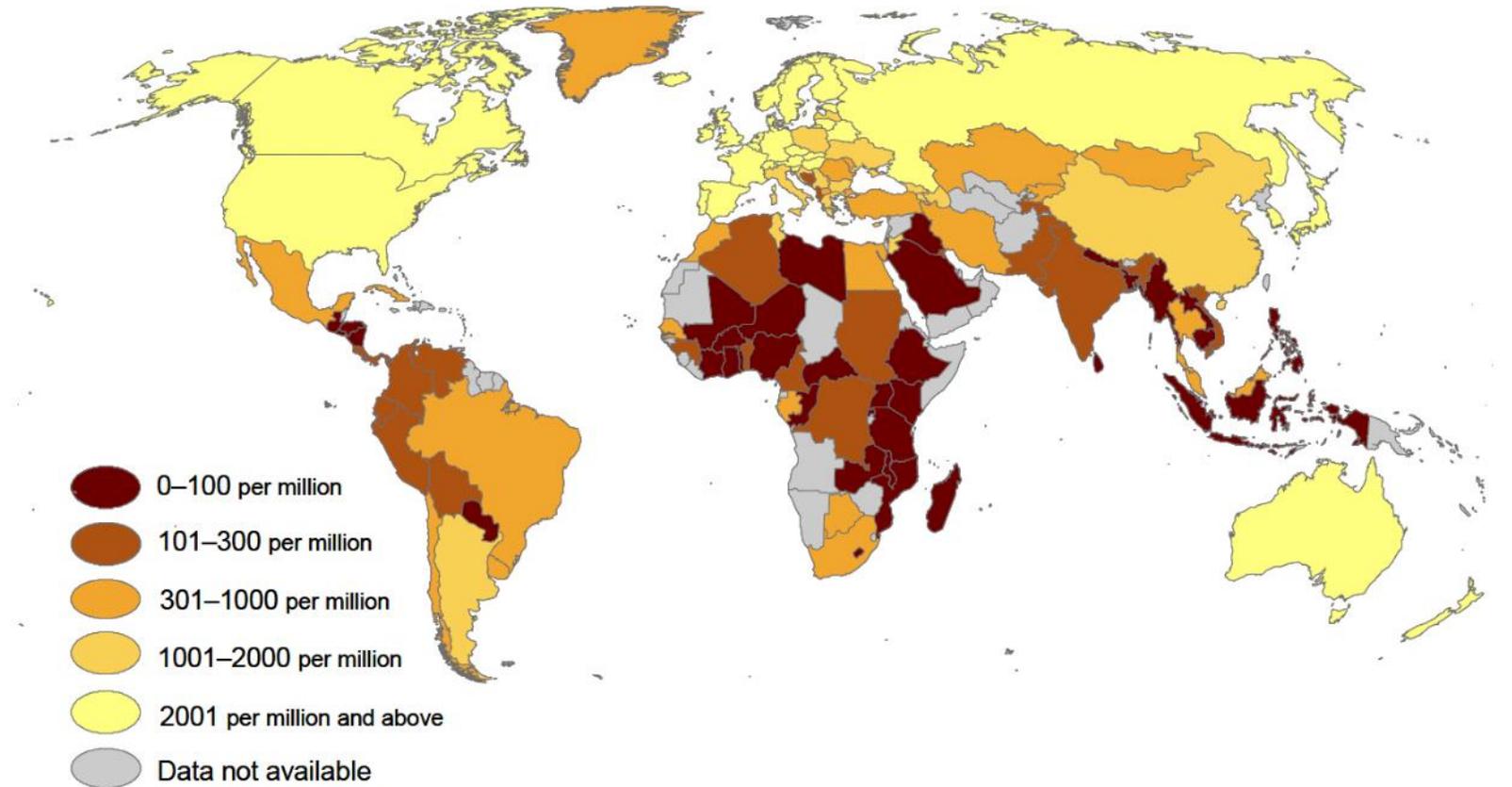


A global network designed to build sustainable research capacity and enhance international understanding



UNESCO: Health research capacity

Researchers per million inhabitants, 2009 or latest available year





UNESCO: Health research capacity

- **Percent of GDP devoted to Research**
 - 2.6% for North America
 - 1.6% for Europe
 - 1.6% for Asia
 - 0.6% for Latin America and the Caribbean
 - 0.4% for Africa
- **Researchers based in Africa account for <1 % of global R&D expenditures**
- **Philanthropic organizations devote <1% of funding in developing countries to capacity building**



Ghana-Yale Partnership for Global Health



Est. 2007

- **Collaborative program in Global Infectious Diseases Research between Noguchi Memorial Institute for Medical Research, Korle Bu Teaching Hospital, University of Ghana Medical School, and Yale University**





Ghana-Yale Partnership for Global Health



Program Components

- **Multi-directional exchange of students and trainees**
 - **Intensive 8 week summer training program at Yale**
 - Mentored research with Yale faculty
 - Didactic Coursework
 - Weekly seminar and research symposium
 - **Yale students mentored at partner sites**
 - Clinical, Laboratory based, and field studies

- **Faculty research collaborations across partner institutions**
 - HIV/AIDS
 - Parasitic diseases (Malaria and helminth infections)

- **Visiting professorships and Continuing Medical Education**

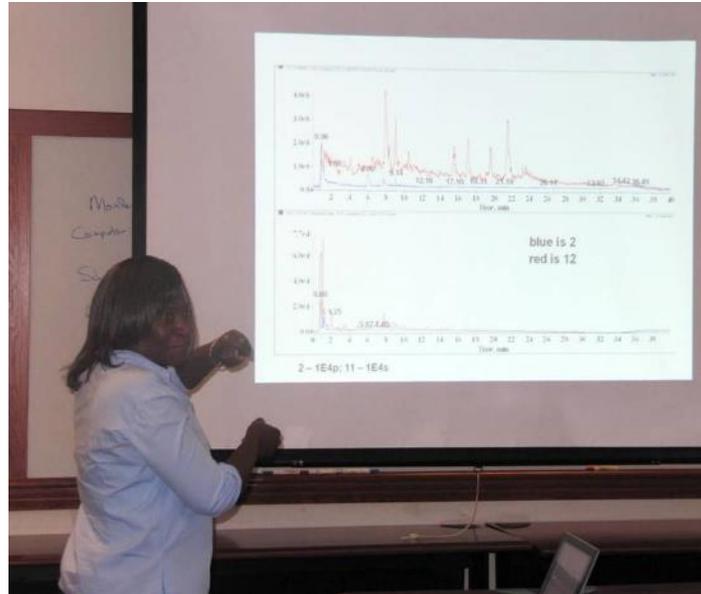
- **Health systems strengthening**
 - Public-Private Partnership development
 - Operations research
 - Capacity building for Ghana Health Service



Ghana-Yale Partnership for Global Health



Discovery of novel antimicrobials from traditional plant medicines in Ghana



Regina Appiah-Opong PhD
Tommy Cheng/Elijah Paintsil (Pharmacology)

Kojo Agyemang
Choukri Ben Mamoun (Internal Medicine)





Epidemiology of parasitic diseases Kintampo North District, Ghana



Ben Simms and Dylan Davey
Yale School Public Health/Medical School



Josephine Quagraine
University of Ghana



Emily Mosites
Yale School of Public Health
Kwabena Bosompem PhD
Noguchi Memorial Institute for Medical Research



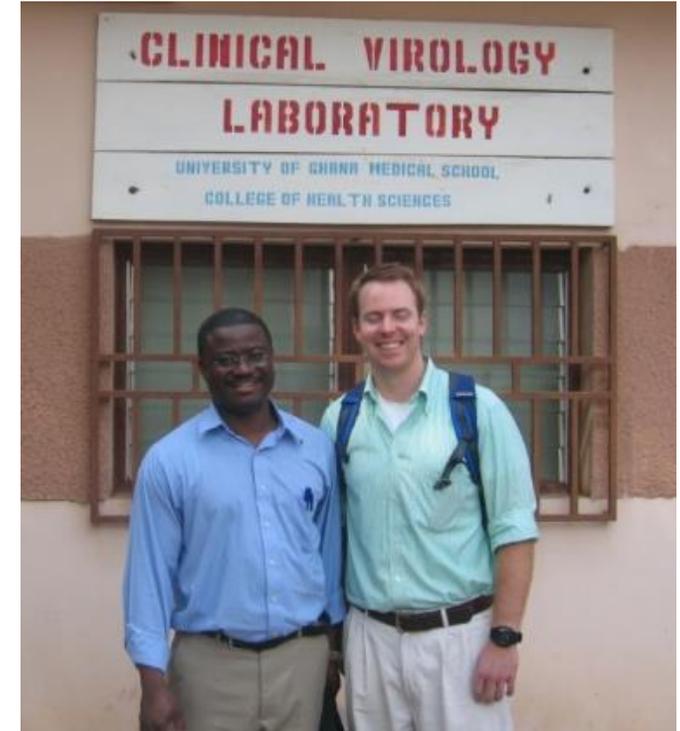
Translational research in Pediatric HIV/AIDS



Evelyn Bonney and Sena Matrevi
University of Ghana



Allison Langs-Barlow
Yale University
Professor Lorna Renner
University of Ghana



Professor Elijah Paintsil and Oliver Barry
Yale University



Ghana-Yale Partnership for Global Health



Results of collaborative research have impacted public health policy and medical practice in Ghana

- **Research conducted at Yale by NMIMR trainees has led to the discovery of two potential new drugs for the treatment of HIV infection and malaria, respectively**
- **Research conducted by UGMS and Yale investigators has discovered low-cost biomarkers that can be used to monitor effectiveness of antiretroviral therapy in children with HIV/AIDS**
- **Studies by Yale and NMIMR investigators have discovered unacceptably high rates of deworming treatment failure in Kintampo**



University of Sao Paulo-Yale Partnership for Global Health



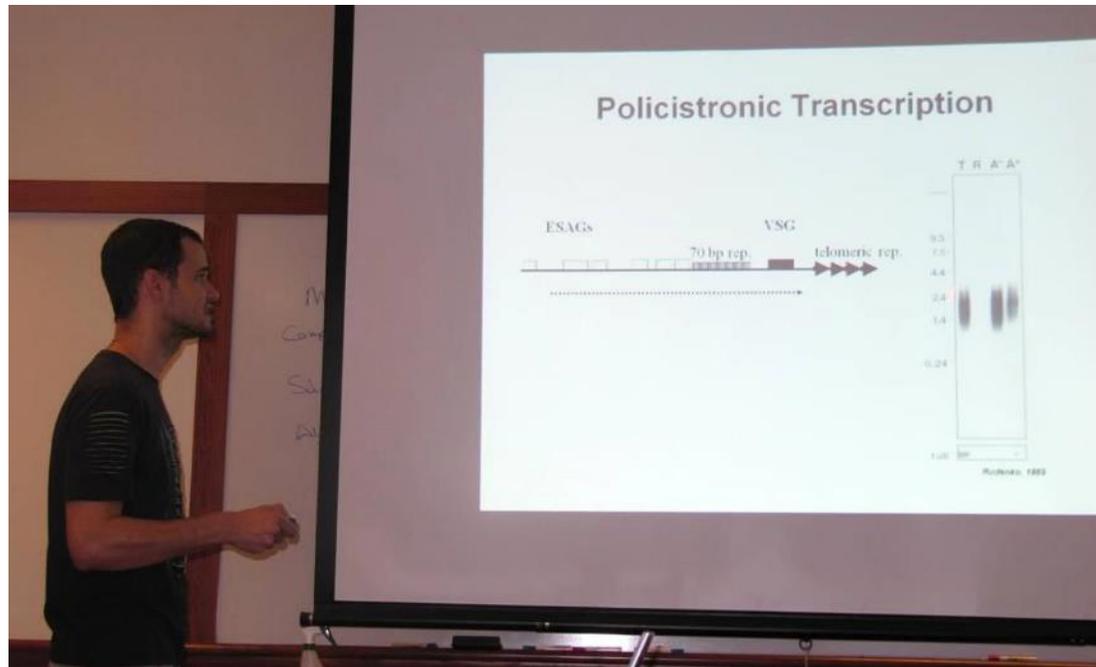


University of Sao Paulo-Yale Partnership for Global Health



USP summer research scholar topics

- Immunology of dengue virus infection
- Gene regulation in trypanosomes
- Pathogenesis of autoimmune diseases
- Genetics of EBV infection





University of Sao Paulo-Yale Partnership for Global Health



USP-Yale Symposium April 2011, Ribeirão Preto, Brazil





KSU-Yale Partnership for Global Health

King Saud University, Riyadh





KSU-Yale Partnership for Global Health

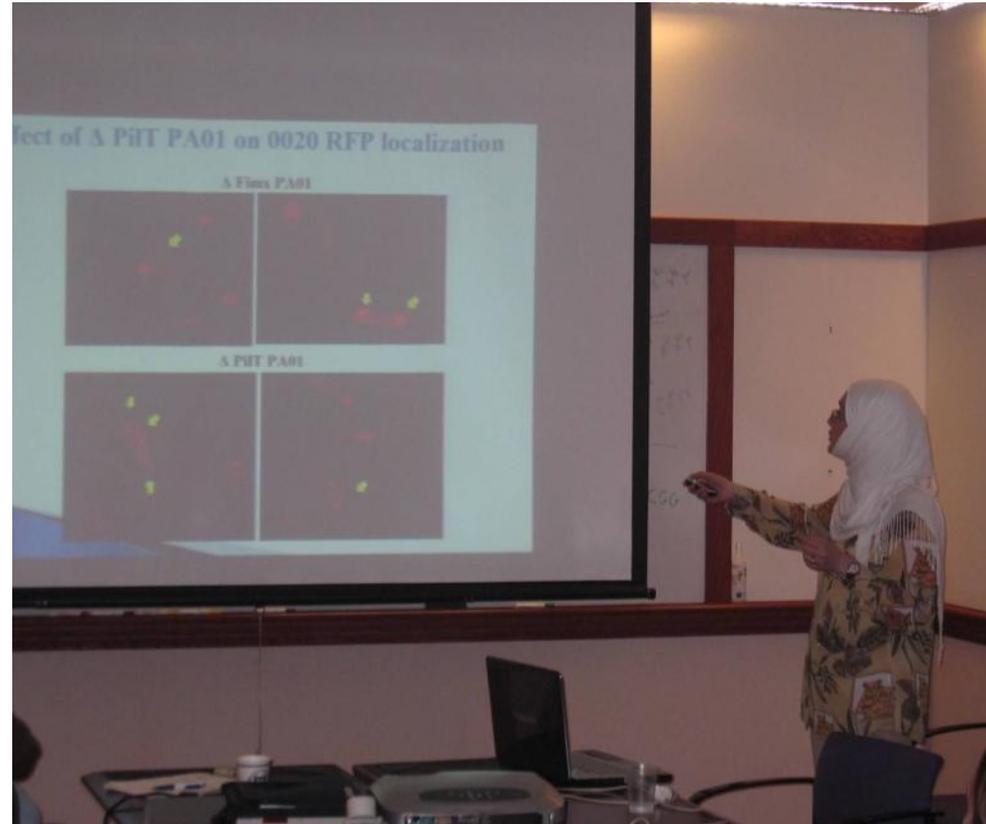
King Saud University, Riyadh



Genetics of multi-drug resistant bacteria



Ahmed Alhazmi



Mysoon al Ansari



Yale Partnerships for Global Health and International Alliance of Research Universities

- Applications accepted via IARU network in 2012-14
- 5 IARU students have participated to date
- Mentored by Yale faculty from multiple departments
 - Microbial Pathogenesis
 - Cell biology
 - Immunobiology
 - Pharmacology
- Participated in program with trainees from
 - Ghana
 - Brazil
 - Saudi Arabia



Thanutra Zhang, Guo Binggege, Maria Oh



Yale Partnerships for Global Health

2012
17 IARU Institution Applicants received
(4 accepted)

| | |
|--------------------------------------|--------------------|
| Peking University (9) | |
| | Dingran Wang |
| | LI Xi |
| | Ping Chen |
| | Zhu Kejun |
| | Thanutra ZHANG |
| | Ada Chan |
| | Hao Sun |
| | Guo Binggege |
| | Yuan He |
| National University of Singapore (4) | |
| | Luo Mingyi Vincent |
| | Anuja Chitre |
| | Eunice Leong |
| | Wu Yilong |
| Australian National University (2) | |
| | Sindhu Adiraju |
| | Maria Oh |
| University of Copenhagen (2) | |
| | Sofie Hansen |
| | Ulrik Mistarz |



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Maria Oh (Australian National University)

- Current position: PhD (molecular biosciences) and JD (law) combined degree candidate at University of Sydney.
- Co-founder and director of BioFoundry, Australia's first community lab for citizen scientists.
- “The summer of 2012 at Yale truly was a turning point in my science education and career. The research experience at Yale highlighted the importance of interdisciplinary approach to resolving complex scientific questions. Consequently, in attempts to expand the scope of my research interests and skills, I completed my honours in biochemistry and molecular biology following graduation.
- “The research experience at Yale was memorable and valuable for many reasons- the opportunity to be exposed to research at the frontiers of medicine and science, the privilege to interact with and learn from many great scientists and be a witness to their determination and dedication to research, which continue to inspire me today.
- “I still keep in contact with fellow IARU interns, and a fellow summer student in the MacMicking lab. I'm also in contact with post-docs in lab who have moved on to other places around the world.”





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Vincent Luo (National University of Singapore)

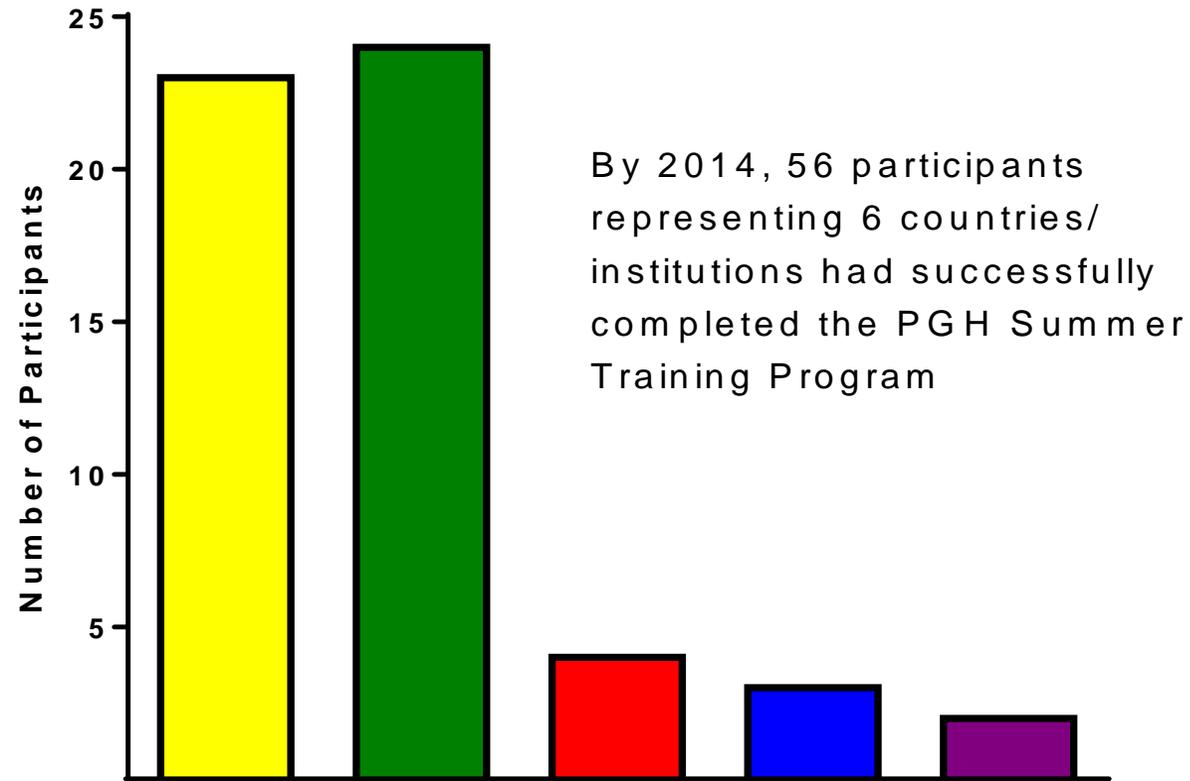
- Current position: Master's degree program in Biology at New York University.
- The program gave me access to the brightest minds in the field and showed me how Science ought to be done. These are huge names in the field, but they still took the time to say 'hi' to you when they passed you along the hallway or speak with you about anything science related.”
- “Armed with the tools I learnt at Yale, I had a lot more to offer my research group when I returned to Singapore.
- “I still keep in touch with students that have participated in the IARU program (Maria- PhD student at University of Sydney and Thanutra Zhang- PhD student at UCSD) and also people I met in the research lab. I treasure these friendships very much and would not hesitate to seek out collaborations with them in future if and when the need arises.



Vincent Luo and Guo Bingegge



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 University of Ghana

 University of Sao Paulo, Brazil

 Peking University

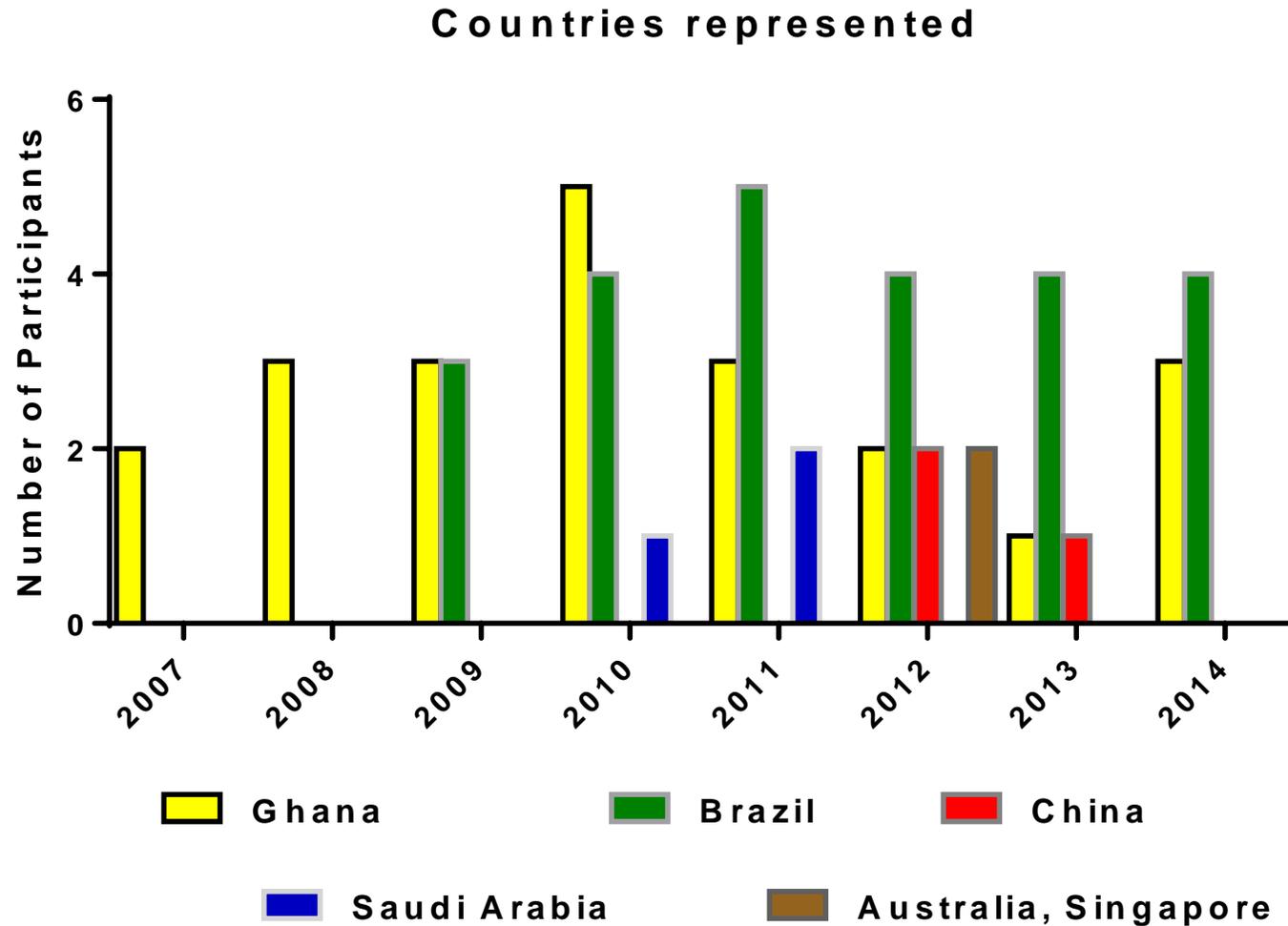
 King Saud University, Saudi Arabia

 Australian National

 University and the National
University of Singapore

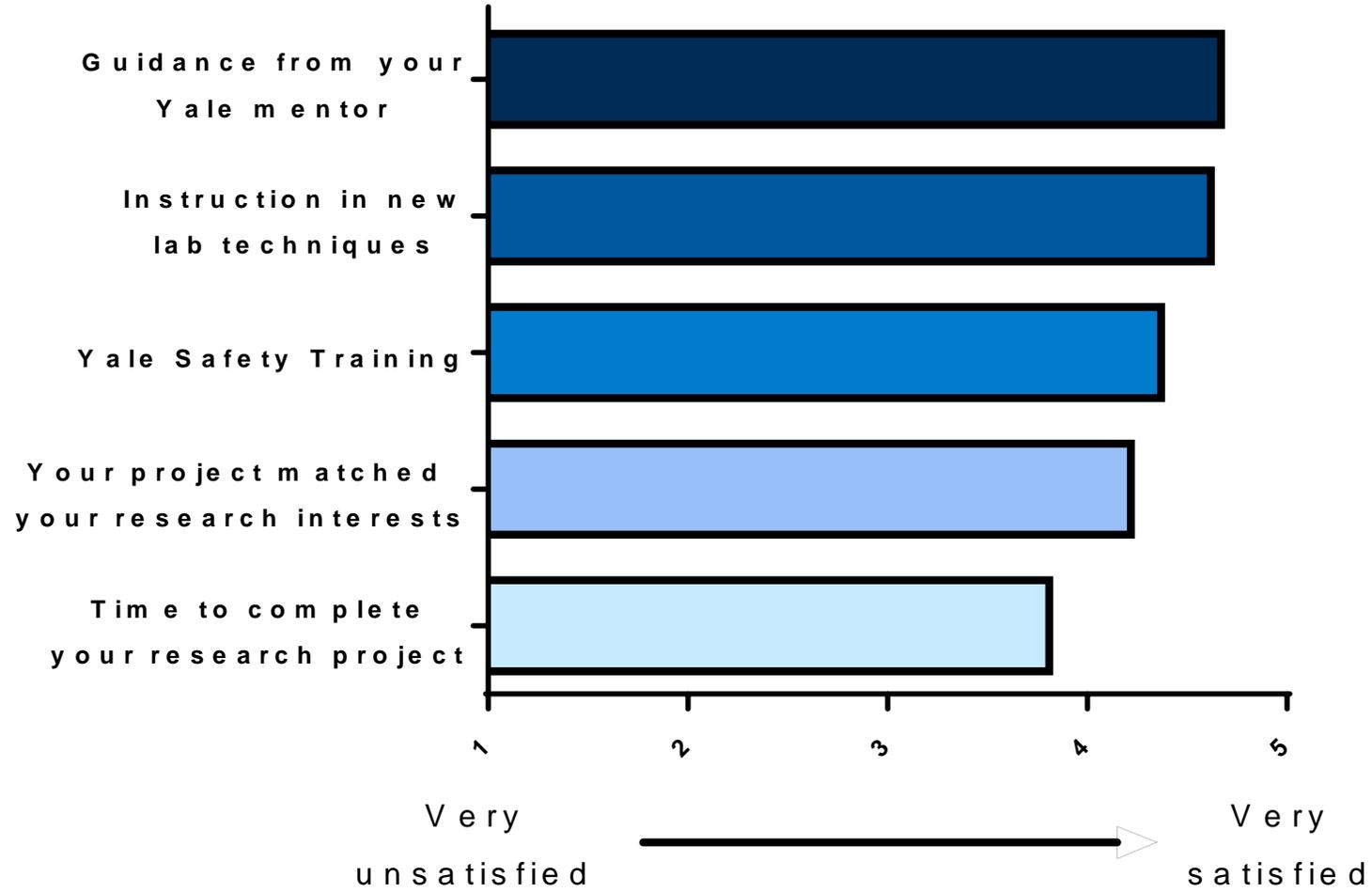


Yale Partnerships for Global Health





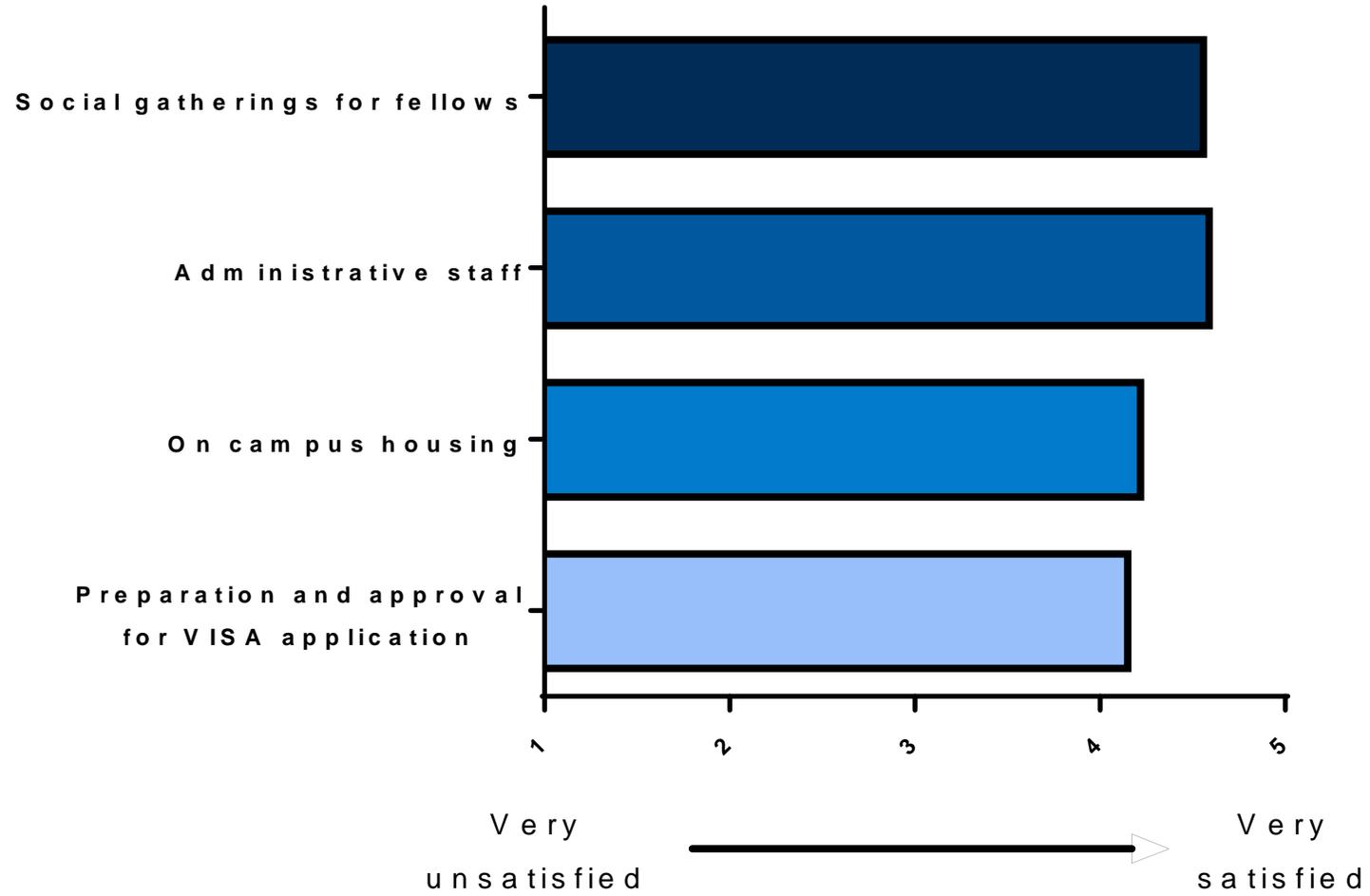
Research Experience



27 survey
respondents



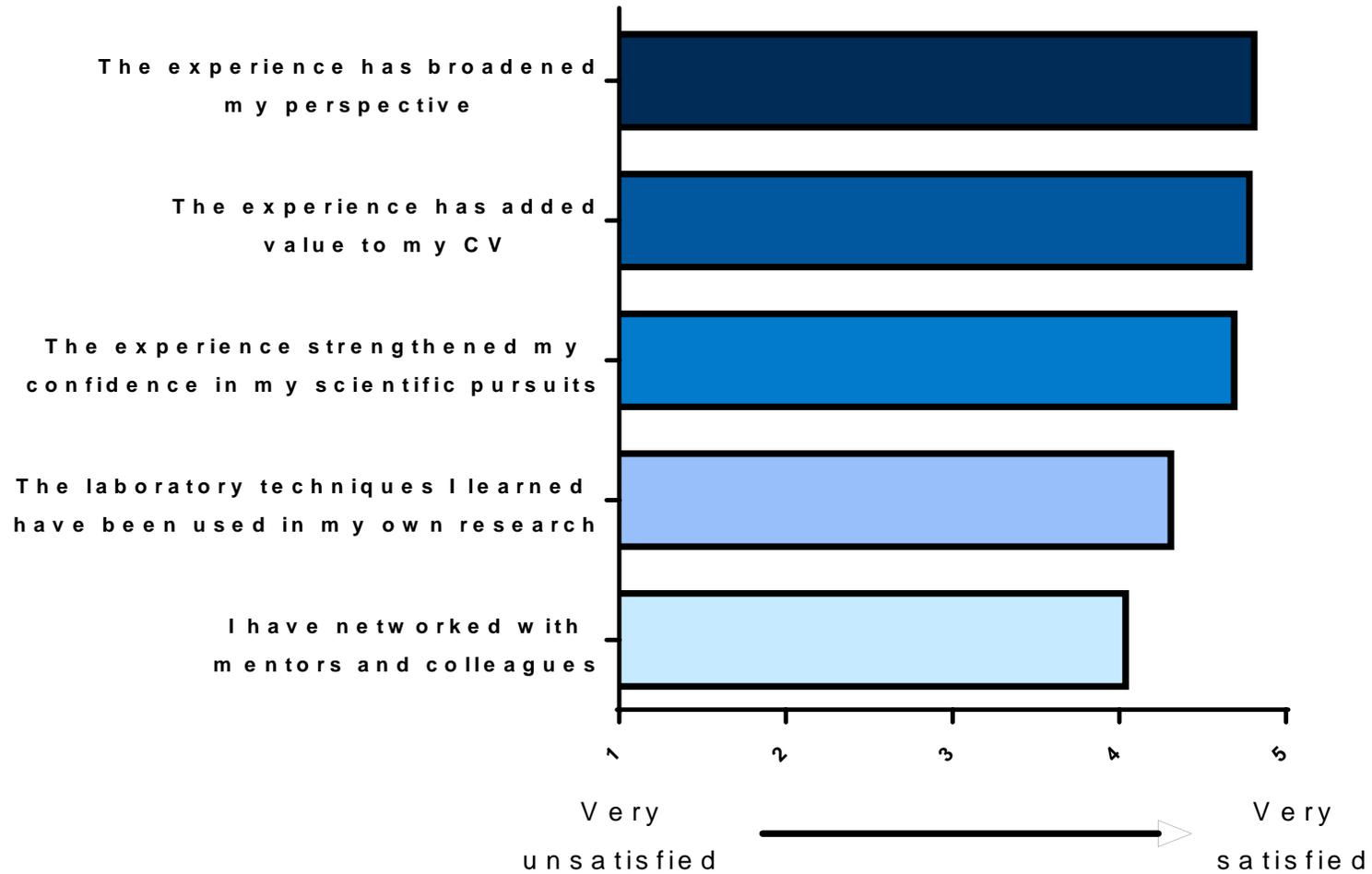
Life Outside the Lab



27 survey respondents



Reflection



27 survey respondents



Yale Partnerships for Global Health

- **Research Scholars: 56**
- **Host Department mentors: 12**
- **Visiting professorships/lectures: 13**
- **Joint manuscripts: 17**
- **Presentations at scientific meetings: 19**
- **Joint patent applications: 1**
- **NIH grants (R01) funded: 2**
- **Foundation grants funded: 2**





Yale Partnerships for Global Health Summer Research Institute (8 weeks)

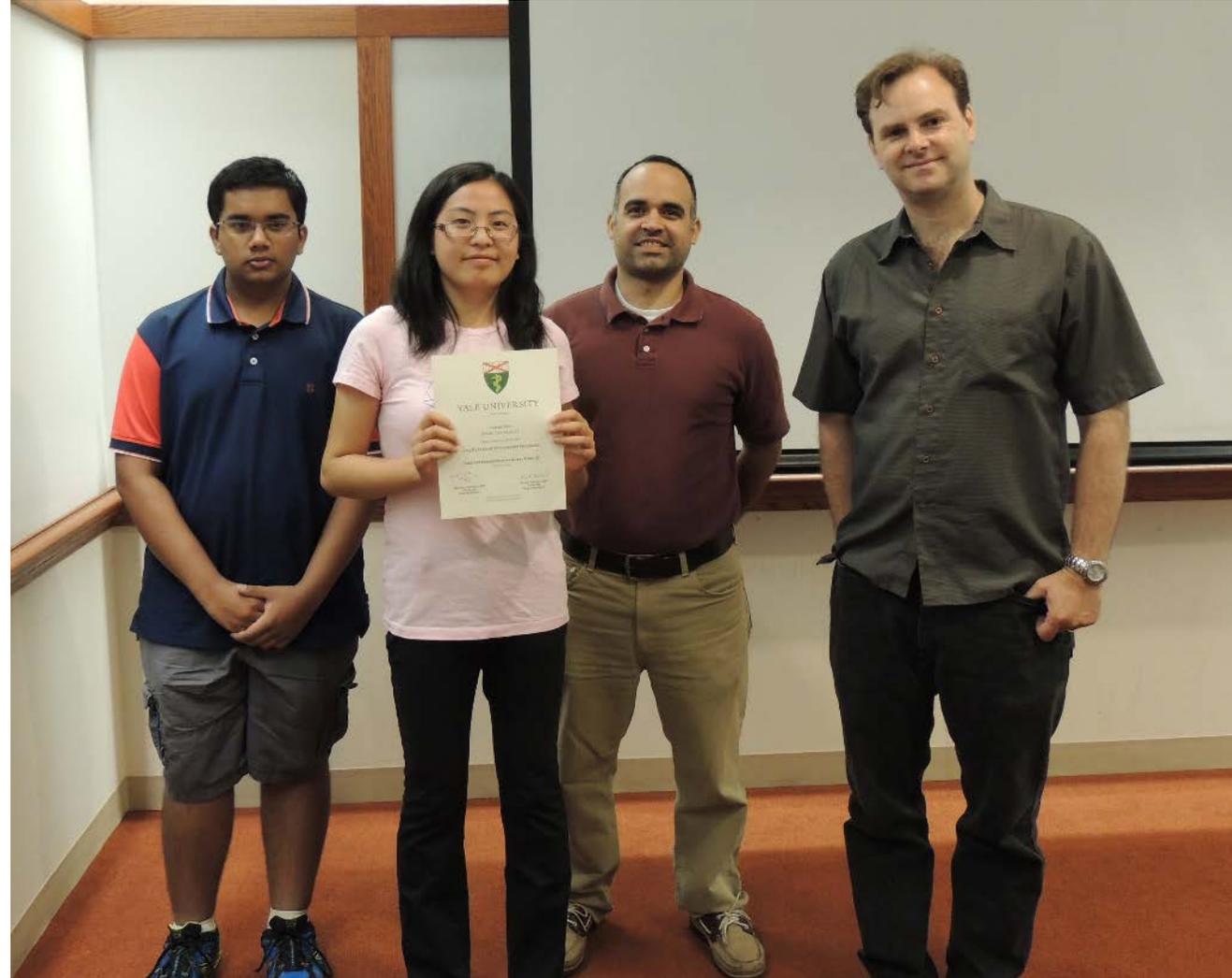
- **On campus housing and meal plan**
- **Full day Biosafety training**
- **Yale Libraries Electronic database training**
- **Yale Investigative Medicine courses**
 - Biostatistics
 - Clinical Research methodologies
- **Weekly faculty seminars**
- **Annual symposium**
- **Social gatherings (World Cup Soccer 2014)**
- **New Haven Arts & Ideas Festival events**



Yale Partnerships for Global Health

Benefits of IARU Participation

- **Transformative experience in a unique setting**
 - World class mentors and research infrastructure
- **New perspective on scientific research in a global context**
- **Development of lifelong friendships and collaborative opportunities**
- **Career development and professional advancement**
 - Strengthen resume
 - Letters of recommendation



Lihan Xie and Professor Toomre's lab



Yale Partnerships for Global Health

Challenges for future IARU participation

- **Discordant academic calendars**
 - Yale housing available for June-July, which is too early for some IARU member institutions
- **Tuition is expensive**
 - 8 week Program cost is \$10-12,000 USD per trainee (including administrative costs)
 - No institutional support or financial aid





Shanahan

"I spend most of my time fund-raising."



Yale Partnerships for Global Health

Support

- Tom Barry
- Jorge Paulo Lemann Foundation
- Helping Africa Foundation
- National Institutes of Health
- HopeXchange International
- University of Sao Paulo
- University of Ghana
- King Saud University





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A global network designed to build sustainable research capacity and enhance international understanding