Medical Research at a Cross-road: Workforce Development, Translational Science and the Future

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Opportunities versus Challenges

**Opportunities:**
- Exciting progress in many areas
- Life science – engine for the future
- Workforce expansion – social mobility
- Scientific knowledge – useful in many careers

**Challenges:**
- Uncertain career paths
- Long, expensive education/training
- Training too narrow?
- Are we providing the right skills?
Some key questions

What is the right size for the future Medical Research and Life Science Workforce?

What skillsets are needed?

How to avoid leakage during training and early independence?

Physician/Scientists - Victims of climate change – triple threat gone?

What can be done and by whom?
Plugging the Leaks in the Scientific Workforce

BY ANNE E. PRESTON

Much more needs to be done to reverse the high rate of attrition of both men and women early in their scientific careers.
The thorny path of an academic researcher

Shaw and Stanton, Proc R Soc B 2012; 279: 3736
Leaky pipeline for physician-scientists
High attrition rate in academic medicine
NIH-funded MDs getting older
Stagnant NIH investments

How to ensure a next generation?
Follow the money – institutions under stress
Revenue
Budgeted Sources of Funds

Operating Funds

Designated or restricted funds are >75% of all sources.

Unrestricted funds are about 25% of the budget and include the annual state appropriate and student tuition.

UC Davis Health is over 50% of all revenue
Investment Categories of the $0.53

Unrecovered F&A Sponsored Research
Departmental Research F&A
Additional Salary Support for Research Effort
Startup Packages
Bridge Funding
Cost Sharing (Both Mandatory & Voluntary Committed)
University Research
Overruns
Other

Average Expenditure by Category

All US medical schools have witnessed prodigious growth fueled by medical service income.

Academic medical centers invest 53 cents for every extramural research dollar. Where is it coming from?
Investments in Life Science – global and US

Global Investment

US Investment

- Federal government
- Business
- Universities and colleges
- Other nonprofit organizations and nonfederal government
Global workforce catching up

Baccalaureate degrees

Doctoral degrees

China  EU-Top 8  Japan  South Korea and Taiwan

United States

U.S. total  U.S. citizens and permanent residents  U.S. temporary visa holders  China  EU-Top 8  Japan  South Korea and Taiwan
Scientific Output – papers and patents

Patents in percent

Scientific papers

Expressed in thousands.

- United States
- European Union
- Japan
- South Korea
- Taiwan
- China
- India
Confidence slowly slipping but still public support for research
Science communication – emerging as an essential skillset:

• Resource centers and workshops (e.g. Alan Alda Center, AAAS, ComSciCon)
• Community Engagement programs in many research centers
• Social media
Life science workforce development hot issue: Lessons from Massachusetts

Key areas:
- Bioinformatics
- Biomanufacturing
- Immigration
- Building a skilled workforce

Overarching theme:
Supply < Demand
Alignment of skillsets and training
We are not alone – same trends in many places

2018 LIFE SCIENCE WORKFORCE TRENDS REPORT

Key Report Findings

5 Key Trends

1. RAPID TECHNOLOGY AND BUSINESS INNOVATION DRIVES TALENT NEEDS
2. DEMAND FOR SOFT SKILLS RISES TO THE TOP While technical skills are
3. REGIONAL CLUSTER-SPECIFIC CHALLENGES EMERGE
4. COMPANIES TAKE DIVERSE APPROACHES TO DIVERSITY
5. INDUSTRY REAPS THE REWARDS OF ACADEMIC PARTNERSHIPS
Who is a translational scientist?

University of California – critical to the future of the state

University of California
- 10 campuses
- 6 medical schools ★
- 3 national laboratories
- 280,000 students and 227,700 faculty and staff
What is done at UC Davis to improve translational science careers?

- Clinical and Translational Science Center – strong focus on training next generation
- NIH BEST program – Broadening Experiences in Scientific Training
- Aggie Square – Focus on lifelong learning and interdisciplinary research
UC Davis Clinical and Translational Science Center
NIH funded since inception of the CTSA program in 2006

Building Research Teams of the Future to Improve Human Health
Growing demands for CTSA translational skills

“Focus on soft skills in technical fields. Reinforce the importance of inter/intra discipline communication.”

“There is so much discussion of soft skills but many facets of soft skills are critical in enabling workers to succeed in such a setting - critical thinking, collaboration, communications, writing, teamwork - the list goes on. Include this in the educational space and we are creating a nation of lifelong learners that can handle anything as the world changes.”

2018 Life Science Workforce Trends Report, Coalition of State Bioscience Institutes
Research training: Scholar Number and Diversity of Disciplines

2018 included 15 scholars in 10 unique disciplines
NIH Director’ BEST Award - Frontiers of University Training to Unlock the Research Enterprise (FUTURE)

- NIH Director’s Broadening Experiences in Scientific Training (BEST) initiative – funded in first cycle 2013
- New training opportunities in Entrepreneurship, Policy, Industry internship, Science communication, and Project management for graduate students and postdoctoral fellows

THE FUTURE PROGRAM

- 194 Graduate students and postdoctoral fellows
- 27 Graduate Programs
- 38 Departments
- 2 Schools:
  - Medicine
  - Veterinary Medicine
- 4 Colleges:
  - Agriculture and Environmental Sciences
  - Biological Sciences
  - Engineering
  - Letters and Sciences
## Program Components

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<tr>
<th>Component</th>
<th>Description</th>
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<tr>
<td>Career Exploration Course</td>
<td>2h/wk for 10 weeks: self-discovery; career skills – career exploration, networking, resume prep, interviewing, negotiating; mentorship; group discussions and hands-on practice</td>
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<td>Partner Network</td>
<td>100+ PhD professionals in a variety of career sectors and job categories: we connect you to our partners for informational interviews, career advice, and mentoring</td>
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<td>Peer Community</td>
<td>Current and past participants share experiences and support each other in career exploration and preparation</td>
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<tr>
<td>Career Exposures</td>
<td>Priority access to FUTURE-sponsored career exposure activities such as career treks, skill building workshops, networking events, and opportunities through the CTSC</td>
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<tr>
<td>Career Exploration Fund</td>
<td>Eligibility to apply for funds to support individual career exploration activities such as workshops, courses, or hosting career-focused campus events</td>
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Career Outcomes

Program Participants Advance in a Broad Range of Careers

WORKFORCE SECTOR
- Academia: 34%
- For-Profit: 45%
- Government: 8%
- Non-Profit: 6%
- Unknown or Other: 45%

Job Functions
- Business Development, Consulting and Strategic Alliances
- Clinical research management
- Clinical services
- *Completing Further Education
- Data Science, Analytics and Software Engineering
- Entrepreneurship
- Intellectual property and law
- Other
- Program or research administration
- Regulatory affairs
- Research staff or Technical director
- Science education and outreach
- Science writing and communication
- Teaching faculty (non-research) or staff

* Academic Postdocs, NPO or Govt. Fellowships; Industry or Govt. Internships
AggieSquare

Features and Benefits

1. **AGGIE SQUARE** Positioned at the heart of the innovation district, the Square connects people in the themed buildings with one another, serving as an impromptu meeting space and a nexus of energy and ideas.

2. **LIFELONG LEARNING** UC Davis Continuing and Professional Education and a network of partners and programs will train generations of workforce.

3. **HOUSING AND MARKET PLAZA** Housing for students and university affiliates is positioned to create a shared space that opens up the Sacramento campus to the community along Stockton Boulevard.

4. **LIFE SCIENCES, TECHNOLOGY AND ENGINEERING** More than half a million square feet of state-of-the-art labs and more. Industry partners will co-locate on campus with UC Davis research programs and will benefit from economies of scale.

5. **MOBILITY HUB** Electric buses, bikeshare, carshare, shuttle services and other enhancements will reduce reliance on single-occupancy vehicles.
AGGIE SQUARE GOALS

1. **ADVANCE** UC Davis innovation across the enterprise

2. **PROPEL** economic development and industry partnerships

3. **CONTRIBUTE** to building more resilient communities

4. **CREATE** shared public spaces & sustainable environments
Aggie Square – first phase under way
UC Davis School of Medicine is ranked #30 in nation for research by U.S. News & World Report – moving up from #39 in 2018!
Thank you!