Status Report
For the ASCR ASCAC Meeting

July 27, 2015
Washington, DC

Outline

- Program characteristics

- Program funding

- 2015 Application process

- Selection process

- Fellows and alumni

Benefits of the Program

With support from ASCR and ASC/NNSA, Department of Energy Computational Science Graduate Fellowship (DOE CSGF) program provides outstanding benefits and opportunities to students pursuing doctoral degrees in fields of study that use high performance computing to solve complex science and engineering problems.

- Stipends ($36,000/year for 4 years)
- Full tuition and fees
- Professional development support
    - $5,000 first year and $1,000 each renewed year
    - Laptop/conference travel/society dues …
- Practicum support (living expenses and travel)
- Annual program review

Fellows Roles and Responsibilities

Fellows are required to:

- Complete their POS and practicum within the required time
- Make satisfactory progress in their thesis research
- Stay in good standing with their graduate program
- Attend the annual program review
- Submit a renewal request each year
- Provide status updates and communicate with Krell staff

The "Terms and Conditions" are a de facto contract between the fellow and the program.

Renewal is not automatic

The Program of Study (POS)

- The POS must demonstrate breadth and include graduate work in science/engineering, computer science, and applied math from the appropriate departments.

- The POS must be successfully completed for graduate credit by the
  - beginning of the third year of the fellowship, or
  - beginning of the fourth year for incoming graduate students

All changes to the POS must be approved by a member of the Steering Committee.

The Practicum

- All fellows must participate in a 12 week research practicum at an approved DOE site.

- The practicum must be completed within the first two years of the program.

- The practicum must be approved in advance.

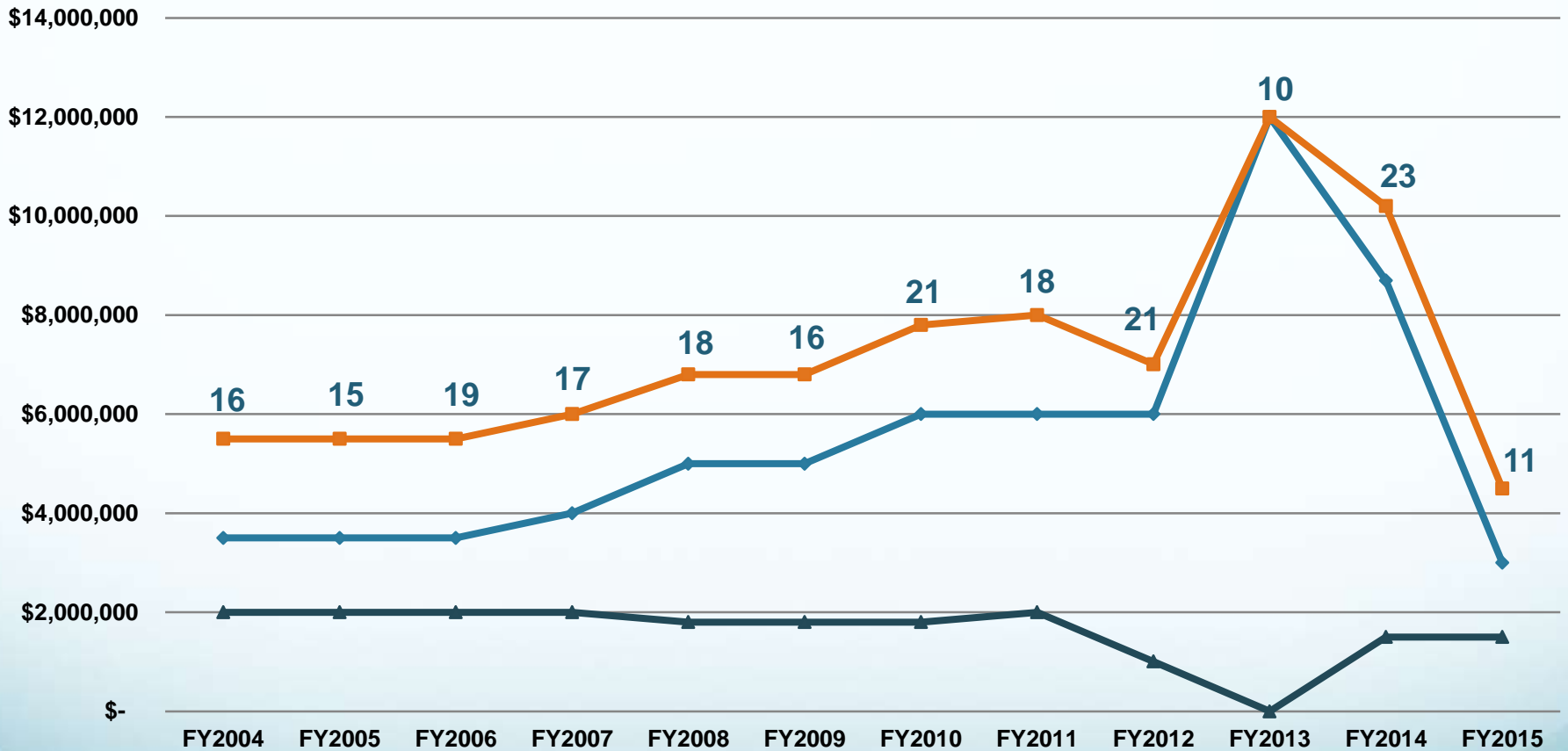- The fellow must be a resident at a DOE lab for the duration of the practicum.

The practicum is meant to broaden the research experience. It should NOT be a continuation of the thesis work.

Average Annual Tuition Cost Per Fellow
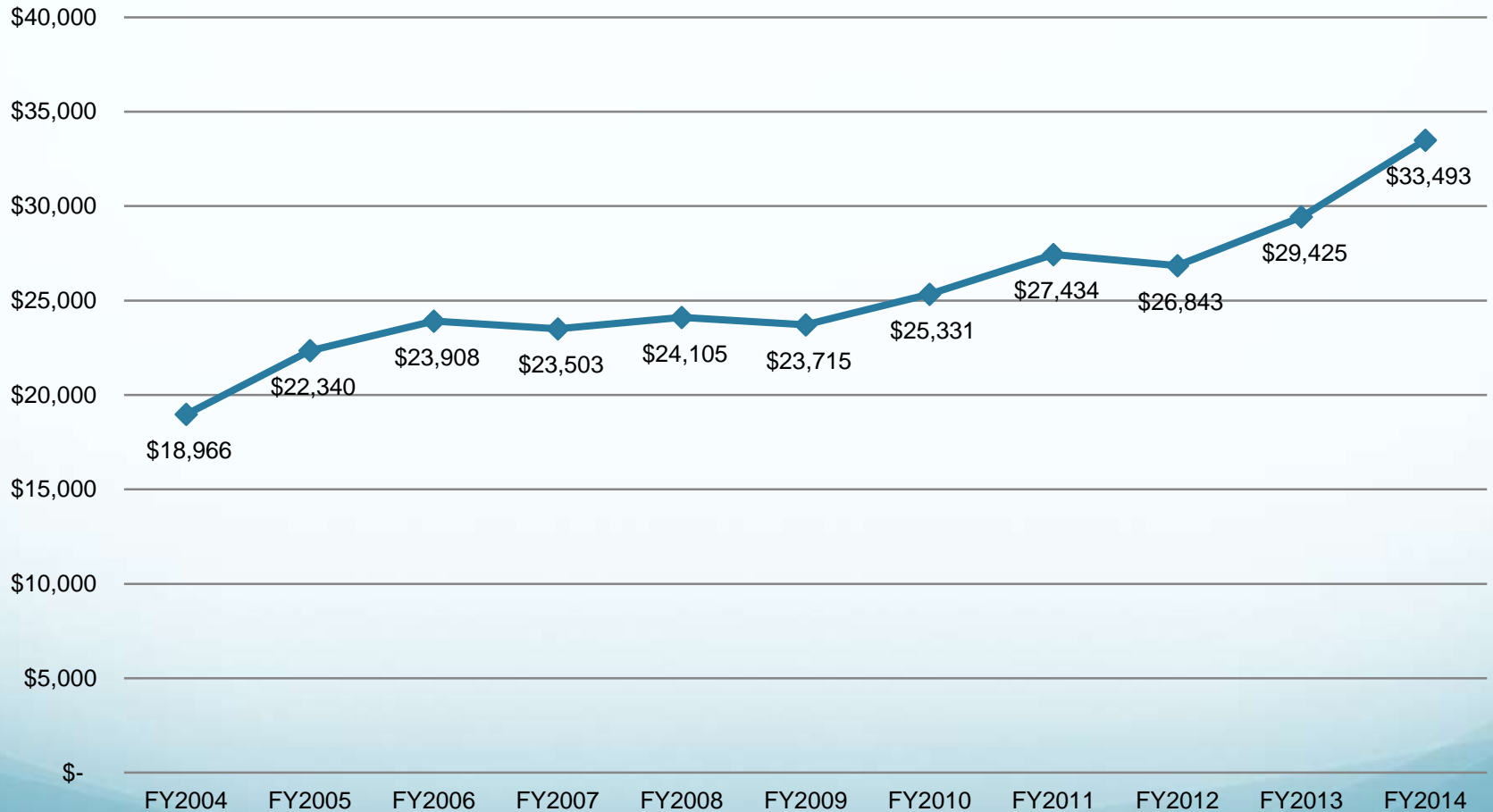
2015 Program Funding

March 2015 — Krell informed of $3M funding with possibility that additional monies might become available ($1.5 ASCR and $1.5 NNSA).

April 2015 — ASCR wins determination from General Counsel that FY15 language of $3M funding for DOE CSGF relates to ASCR only and does not affect NNSA contributions. Additional $1.5M contributed by ASCR.

Total $4.5M in funding available.

2016 Program Funding Discussion

March 2015 — Krell informed by ASCR that current budget contains $10M for DOE CSGF funding in the exascale crosscut budget.

April 2015 — FY16 House Energy and Water Development Appropriations Bill includes DOE CSGF funding of $8M.

May 2015 — Senate bill contains DOE CSGF funding of $10M.

NNSA plans to continue support at $1.5M.

Management

DOE

- ASCR
- NNSA/ASC

Krell

Steering Committee

- Nine people
- Academia, DOE Laboratories, industry
- Includes program alums

2015 Application Process

Online Application

POS

- 2 courses in each of science/engineering, CS and math
- Added requirement of course in parallel computing
- Added a question about programming languages

Essays

- Field of Interest — personal research interest and its relationship to computational science
- Program of Study — why courses chosen reflect the goals of POS
- HPC and Research — role of HPC in research area

Three references

Technical and extracurricular accomplishments

Eligible Applicants

Undergraduate senior students

First-year doctoral students

Master's degree students

- Changes in direction required

Employed

Application Statistics

Description	2015	2014	2013
Application Open Date	12/17/2014	11/19/2013	10/23/2012
Days Open	43	50	78
On-time/Delayed Start	Delayed	Delayed	On-time
Total Applications	**342**	**420**	**532**
Undergraduate Applications	82 (24%)	103 (24%)	124 (23%)
Ineligible (across all stages)	17 (5%)	28 (7%)	31 (6%)
Total to Screening	330	397	507
Selection (Round 1)	164	176	190
Selection (Round 2)	77	81	90
Selection (Round 3)	33	43	42
Fellowships Awarded	**11***	**23**	**10**

* 2015: *Initially awarded 7 fellowships based on $3M (ASCR+ NNSA); 4 added after 4/30/15 ASCR funding ($1.5M).*

Selection Process

Screening

21 teams of two people

- Large fraction are alumni
- Academia, government labs, industry

Each team read ~ 15 applications

Each team selected ~ 8 for further consideration

Completed in February

Selection

Initially 164 applications

Twelve members form Selection Committee
- Formed into 12 teams of 2 each
- Review by phone and email to arrive at 77 applications for further review in NYC

Meet in NYC in March first as 2 groups of 6
- Cut down to 33 for further consideration
- Full committee of 12 spent full day discussing remaining applications resulting in 9 finalists

Serves as guideline to Krell

All reviewing and voting is done on-line

Added Complexities

Initially Krell was told it had $3M for 2015 awards

Provided support for 7 fellows (2 deferrals; 5 new offers)

- Offers made in March
- Small number were not declined in the hope that additional funding might become available

On April 30, Krell was told that an additional $1.5M was available and 4 additional awards were made

2015 New Fellows

Fellow	Institution	Field of Study
Richard Barnes	UC Berkeley	Ecology
Casey Berger	UNC Chapel Hill	Theoretical & Computational Physics
Nicholas Boffi	Harvard	Applied Mathematics
Maximillian Bremer	UT Austin	Computational Mathematics
Emmet Cleary	Princeton	Mechanical & Aerospace Engineering
Zane Crawford	Michigan State	Electromagnetics
Ian Dunn	Columbia	Chemical Physics
Carson Kent	Stanford	Computational & Mathematical Engineering
Hannah Klion	UC Berkeley	Astrophysics
Noah Mandell	Princeton	Plasma Physics
Helena Qi	MIT	Chemistry

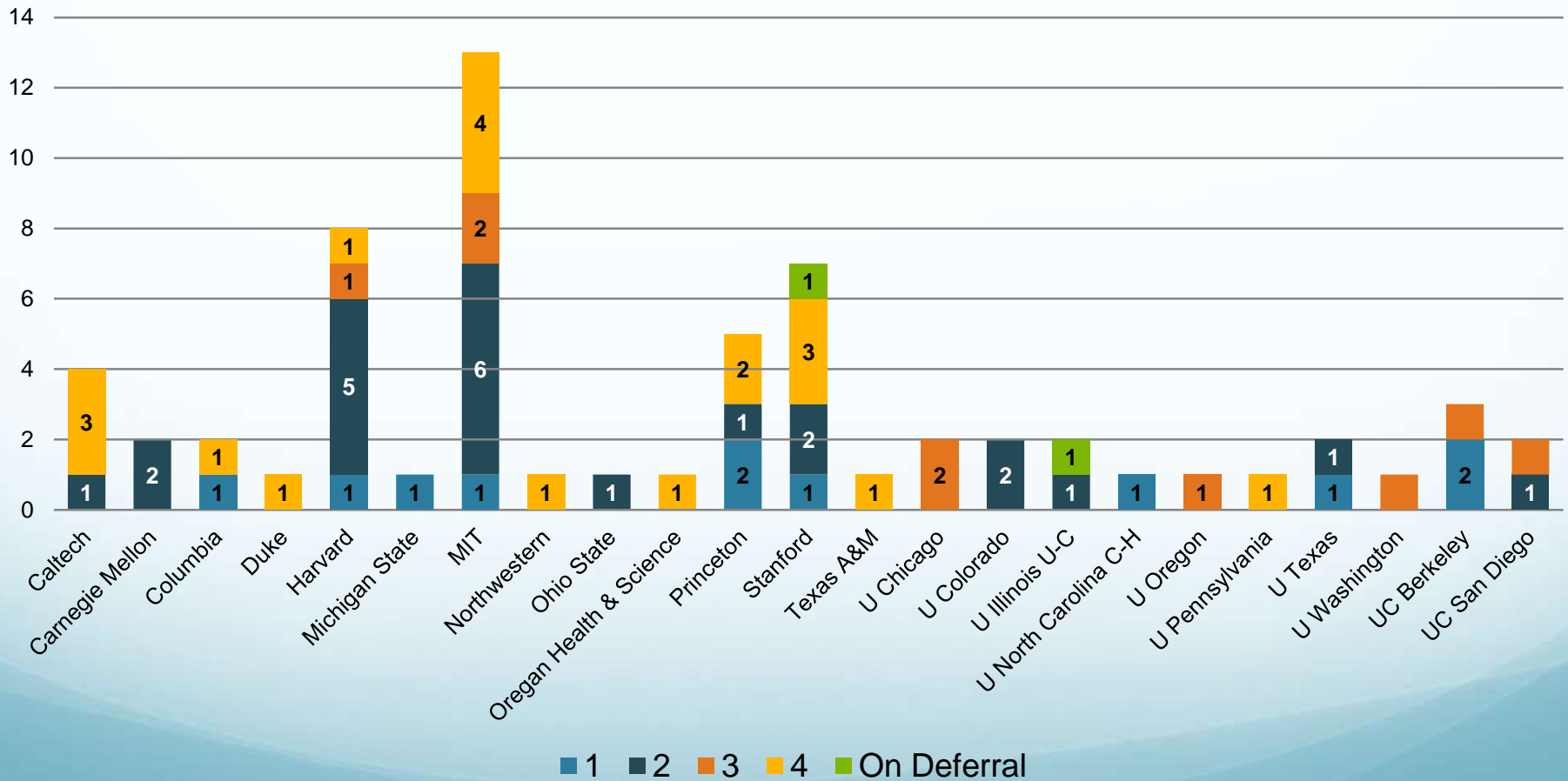# Fellows and Alumni

Disciplinary Distribution Over Time

Disciplinary breakdown of each fellow class (by year) since inception.
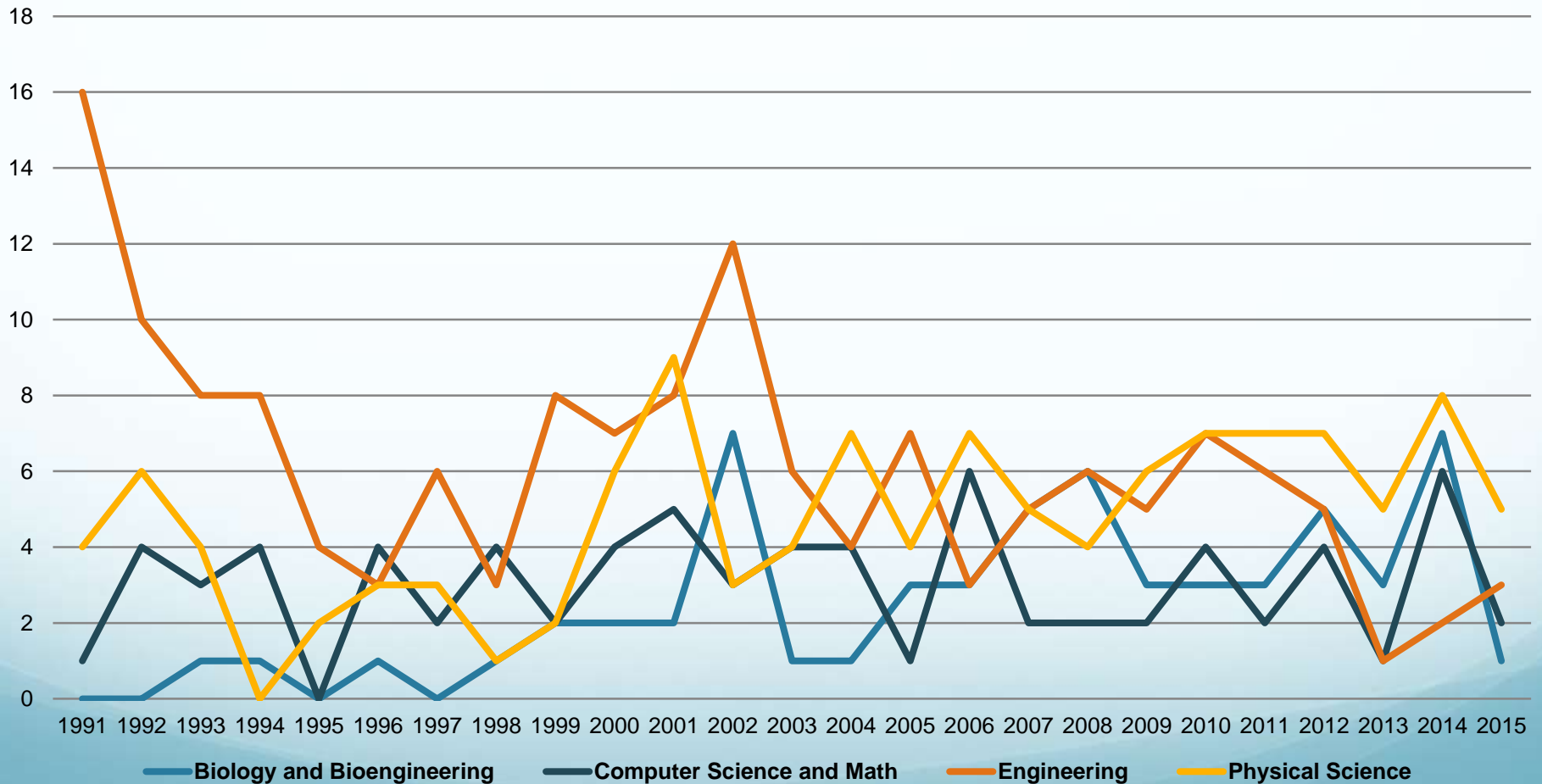
Fellows by Institution

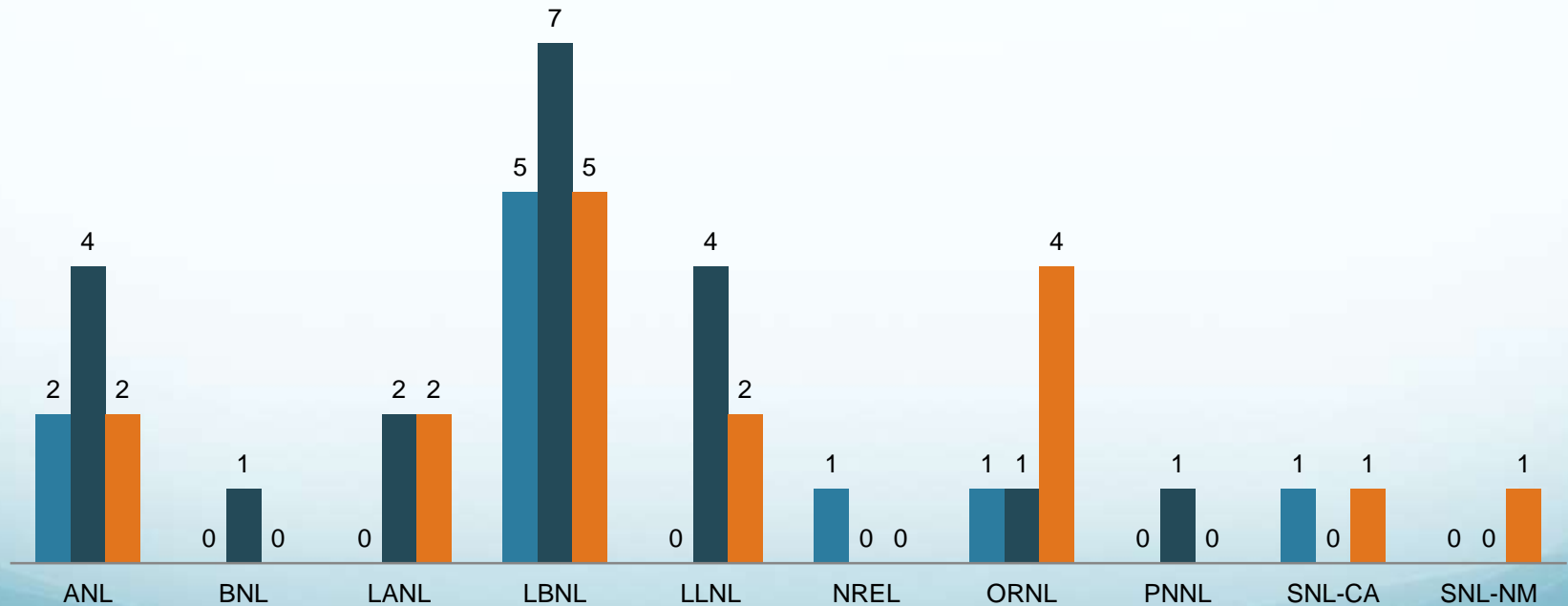**Schools Attended by Fellows (by program year)**
64 students as of 9/2015

Practicum Assignments

In both 2013 and 2014, there were two second practicum.
Two second practicums are also planned for 2015.

Practicum Students by DOE Laboratory, 2013-2015

■ 2015 Proposed ■ 2014 ■ 2013

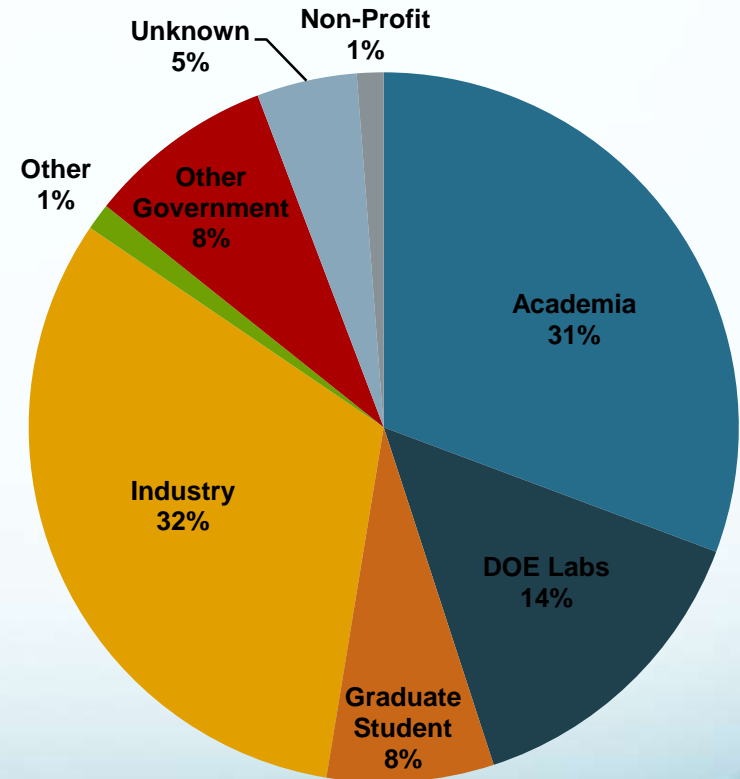| Laboratory	2015 Proposed	2014	2013
ANL	2	4	2
BNL	0	1	0
LANL	0	2	2
LBNL	5	7	5
LLNL	0	4	2
NREL	1	0	0
ORNL	1	1	4
PNNL	0	1	0
SNL-CA	1	0	1
SNL-NM	0	0	1

Alumni: Where are they now?

Krell has current employment data for 314 alumni grouped as follows:

- Academia   101
- Industry   105
- DOE Labs   47
- Other Gov't.   28
- Grad. Student   25
- Other   4
- Nonprofit   4
- Unknown   15

Current as of 3/25/2015.
Information is self-reported by alumni.

Alumni by Employment Category

- Unknown 5%
- Non-Profit 1%
- Other 1%
- Other Government 8%
- Academia 31%
- Industry 32%
- DOE Labs 14%
- Graduate Student 8%

Program Review

DOE CSGF Program Review this week (July 27-30)

- **All fellows and many alumni attend**
- **Graduating fellows present research**
- **2nd and 3rd year fellows present posters**
- **Various training activities**
- **For Tuesday**
  - Alumni Keynote by Sommer Gentry, US Naval Academy
  - Howes Award
  - Fellows Presentations — Tuesday through Thursday
- **For Wednesday**
  - Keynote Address by Steven Esser, IBM
  - Luncheon Address – Paul Doucettes, Batelle
  - DOE Lab Poster Session — Wednesday 4:30-6 p.m.

- **For details see https://www.krellinst.org/csgf/conf/2015**

Questions

Backup slides

Steering Committee

Committee Member	Organization
David Brown	Lawrence Berkley
Silvia Crivelli	University of California, Davis
John Dolbow	Duke University
Roscoe Giles	Boston University
James Hack	Oak Ridge
Jeffry Hittinger	Lawrence Livermore
Nelson Hoffman	Los Alamos
David Keyes	KAUST
Robert Voigt	Leidos

Consistency in Applicants

Year	Number of Applicants	UGPA (Average)	Average % GRE Verbal	Average % GRE Quantitative
2006	410	3.61	75	82
2007	396	3.68	75	85
2008	371	3.64	78	87
2009	349	3.60	79	86
2010	531	3.59	77	84
2011	628	3.64	77	85
2012	729	3.64	79	86
2013	532	3.61	79	85
2014	420	3.68	84	87
2015	**342**	**3.70**	**84**	**86**

Applicants by Gender

Applicants are asked to fill out a survey with demographic questions. Gender and race responses are not required.

All Applicants by Gender, 2013-2015 (%)

Legend: ■ Male ■ Female ■ Did Not Report

Year	Male	Female	Did Not Report
2015	67	21	12
2014	58	23	19
2013	65	19	16
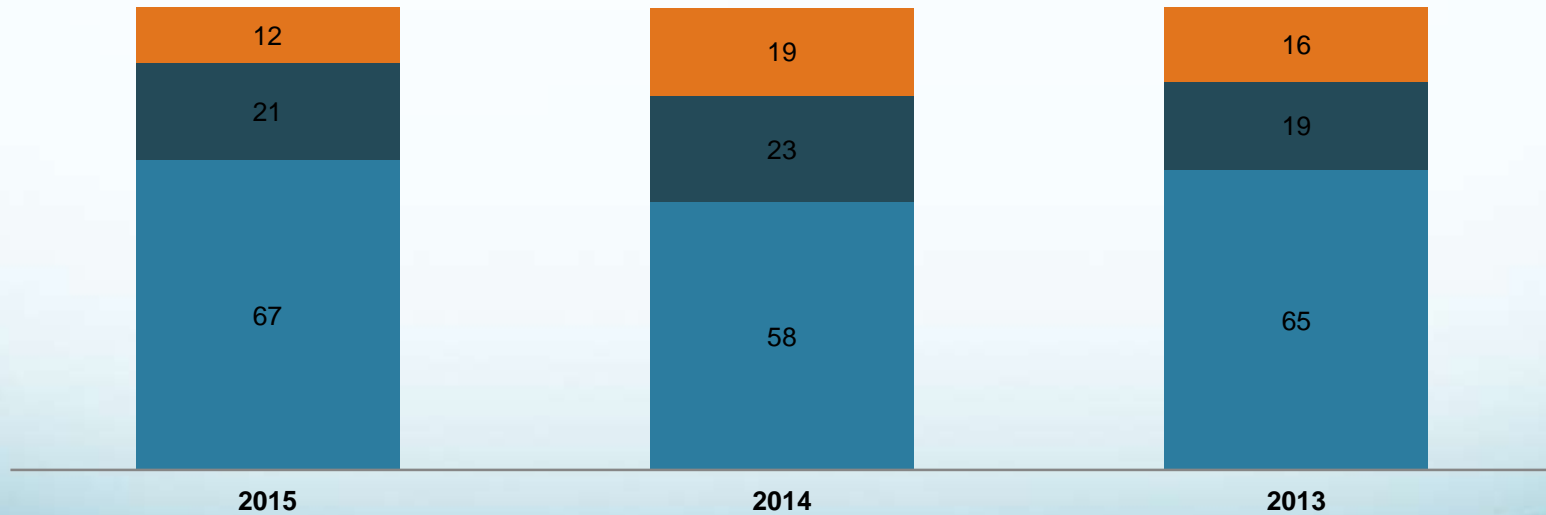
Finding Applicants

- Historical data tells us that most applicants hear about the fellowship from faculty and student peers. Our primary recruitment effort has been direct mail to universities.

- Krell was not able to send out a recruitment mailing in 2014; instead, 1,700 contacts (six groups) were emailed the day the application opened (December 17).

- The past two years have brought a decline in final submissions, which we believe is largely attributable to the number of days the application was open.
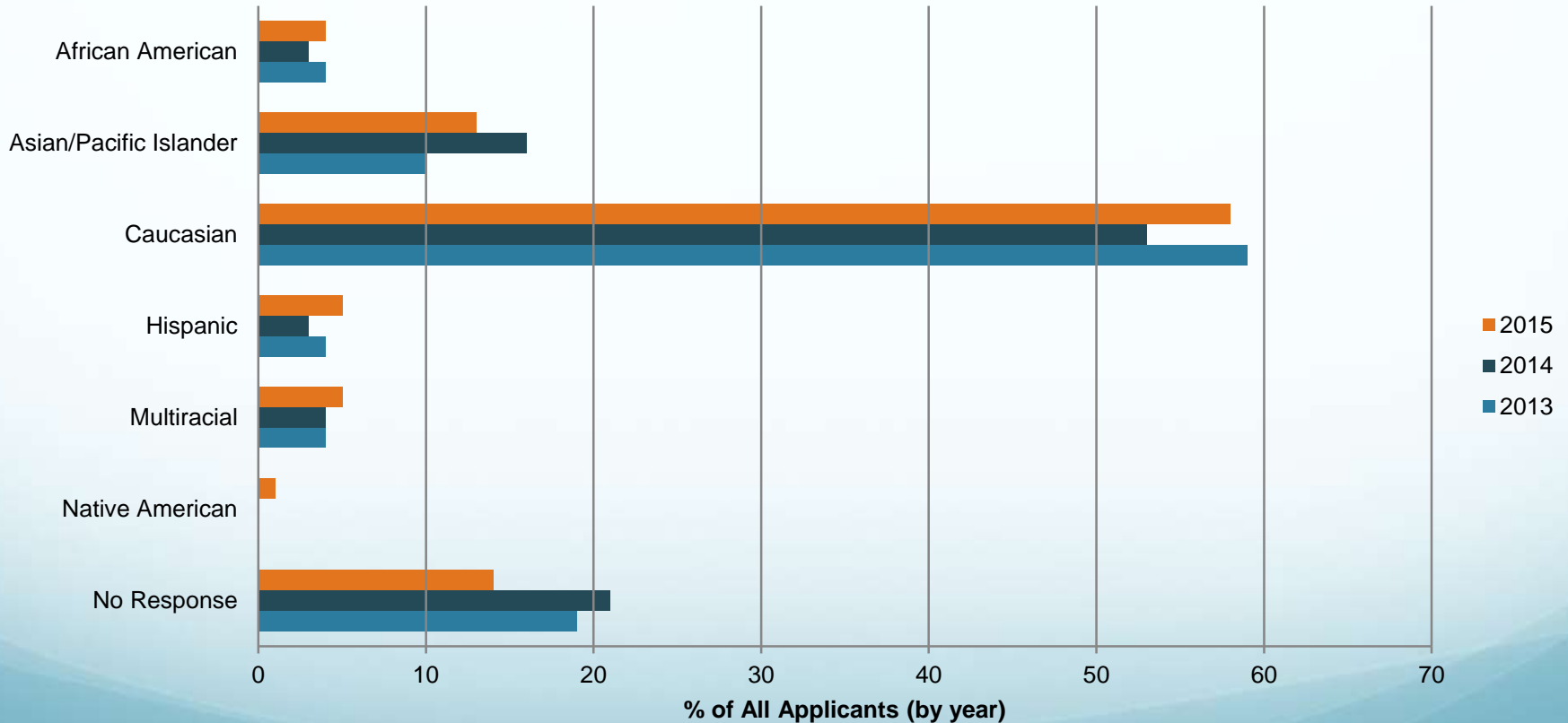
Applicants by Permanent Address

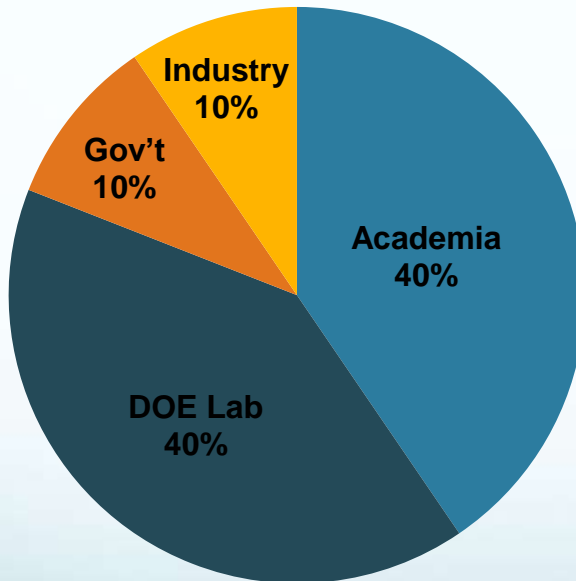342 applicants/339 valid US zip codes/3 others

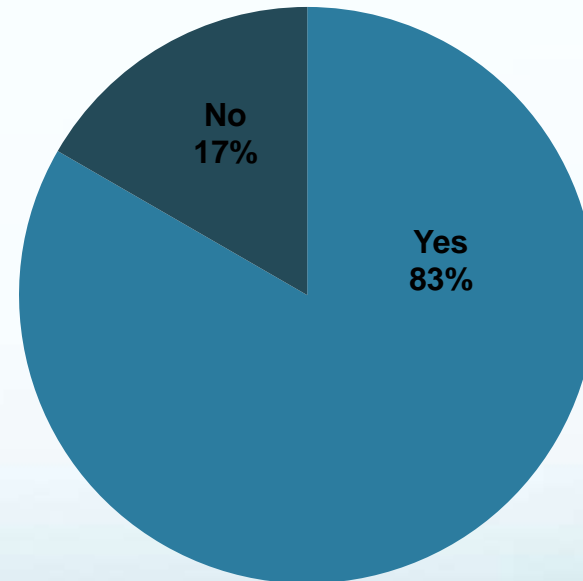# Applicants by Race

All Applicants by Race, 2013-2015 (%)

2015 Screening Committee

42 members organized in teams of two.

2015 Selection Committee

Committee Member	Organization
Tom Adams	Lawrence Livermore, retired
Leszek Demkowicz	University of Texas at Austin/ICES
Judith Hill	Oak Ridge
Jeffrey Hittinger	Lawrence Livermore
Nelson Hoffman	Los Alamos
Ying Hu	Salk Institute for Biological Studies
Gianluca Iaccarino	Stanford University
Kary Myers	Los Alamos
Peter Nugent	Lawrence Berkeley/UC Berkeley
Sarah Richardson	DOE Joint Bioenergy Institute
Andrew Siegel	Argonne/University of Chicago
Robert Voigt	Leidos

Gender/Race by Application Stage

% of total at each stage

Variable	All Applicants	After Screening	After Round 1 Selection	After Round 2 Selection	Finalists
Males	67	62	69	64	67
Females	21	25	22	27	33
No Response	12	13	9	9	---
African American	4	1	1	3	11
Asian/Pacific Islander	13	12	12	9	11
Caucasian	58	66	70	70	78
Hispanic	5	5	5	6	---
Multi-Racial	5	2	3	3	---
Native American	<1	0	0	0	---
No Response	15	14	9	9	---

Discipline by Application Stage

% of total at each stage

| Discipline	All Applicants	After Screening	After Round 1 Selection	After Round 2 Selection	Finalists
Biological Sciences & Bioengineering	22	23	26	30	22
Computer Science & Applied Mathematics	14	14	9	12	11
Engineering	36	35	27	18	22
Physical Sciences	28	28	38	40	45

Academic Status by Application Stage

% of total at each stage

Academic Status	All Applicants	After Screening	After Round 1 Selection	After Round 2 Selection	Finalists
Undergraduate Student	24	28	30	33	33
Master's Degree Student	5	2	4	9	22
Graduate Student	60	61	62	55	45
Employed	8	8	4	3	---
2+yrGS (ineligible)	3	---	---	---	---

Practicum Assignments Over Time

Practicum Count by DOE Laboratory, 1992-2014
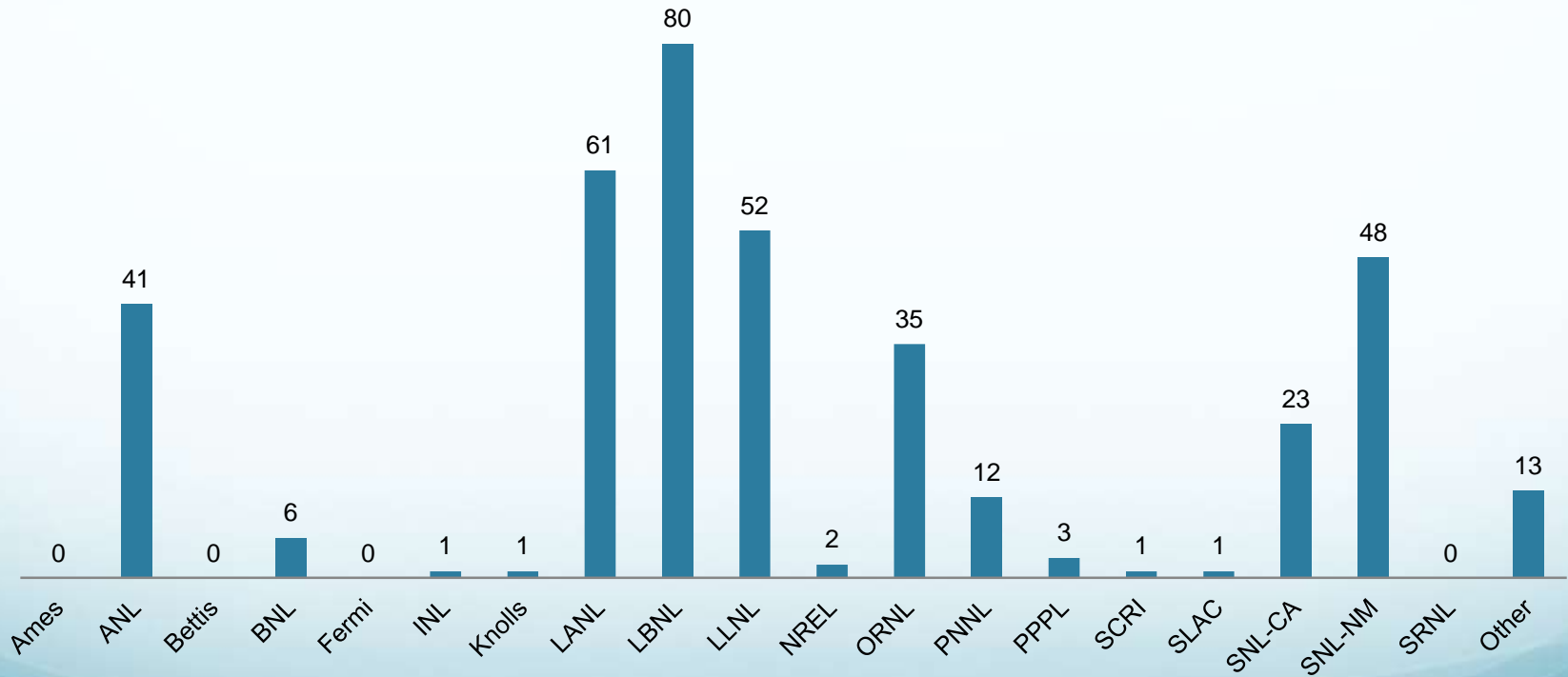
NYC Applicants by Undergrad Institution

Selection Round 3 (27 total universities across 33 students)

- Arizona State
- Caltech (2)
- CSU, Fullerton
- CO Sch. of Mines
- Cornell
- Dartmouth
- Harvard (3)
- MIT (2)
- Michigan State

- Northwestern
- Ohio State
- Princeton
- Sonoma State
- UC Santa Cruz
- U Central FL
- U Chicago
- UIUC
- U MD, Coll. Park

- U MN, Tw. Cities (2)
- U Pennsylvania
- U Rochester
- UT Austin
- U Utah
- U Washington (2)
- U Wyoming
- Virginia Tech
- Yale

Complete listing of NY-bound applicants by undergraduate institution available as handout.

NYC Applicants by Top Ph.D. Institution

Selection Round 3 (17 total universities across 33 students)

- Caltech (2)
- Carnegie Mellon (2)
- Columbia
- Harvard (2)
- MIT (2)
- Michigan State
- Princeton (4)

- Stanford (7)
- U Arizona
- UC Berkeley (3)
- UC Davis
- UC Santa Cruz
- UIUC
- U North Carolina

- U Pennsylvania
- U Texas (2)
- U Washington

Disciplinary Distribution

Field Area	2015 (11)		Fellows (69)		Alumni (329)	
Biological Sciences & Bioengineering	2	(18%)	18	(26%)	42	(13%)
Computer Science & Applied Mathematics	2	(18%)	13	(19%)	61	(18%)
Engineering	2	(18%)	13	(19%)	137	(42%)
Physical Sciences	5	(46%)	25	(36%)	89	(27%)