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.*
anticipated contributions for 2015 included

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Numbers above the top graph indicate fellows funded

ASCR  NNSA  Total
Average Annual Tuition Cost Per Fellow

FY2004: $18,966
FY2005: $22,340
FY2006: $23,908
FY2007: $23,503
FY2008: $24,105
FY2009: $23,715
FY2010: $25,331
FY2011: $27,434
FY2012: $26,843
FY2013: $29,425
FY2014: $33,493
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

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

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

- Caltech: 3 (3x1)
- Carnegie Mellon: 2 (1x2)
- Columbia: 1 (1x1)
- Duke: 1 (1x1)
- Harvard: 1 (1x1)
- Michigan State: 5 (5x1)
- MIT: 1 (1x1) + 2 (2x1)
- Northwestern: 4 (4x1)
- Ohio State: 1 (1x1)
- Princeton: 1 (1x1) + 2 (2x1)
- Stanford: 1 (1x1) + 2 (2x1)
- Texas A&M: 1 (1x1)
- U Chicago: 1 (1x1)
- U Colorado: 1 (1x1)
- U Illinois U-Ch: 1 (1x1)
- U North Carolina: 1 (1x1)
- U Pennsylvania: 1 (1x1)
- U Oregon: 1 (1x1)
- U Texas: 1 (1x1)
- UC Berkeley: 2 (2x1)
- UC San Diego: 1 (1x1)

Legend:
- Blue: 1
- Green: 2
- Orange: 3
- Yellow: 4
- Green: On Deferral
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

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<th>Laboratory</th>
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<tr>
<td>SNL-NM</td>
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</table>
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.
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
<table>
<thead>
<tr>
<th>Committee Member</th>
<th>Organization</th>
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<tbody>
<tr>
<td>David Brown</td>
<td>Lawrence Berkley</td>
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<tr>
<td>Silvia Crivelli</td>
<td>University of California, Davis</td>
</tr>
<tr>
<td>John Dolbow</td>
<td>Duke University</td>
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<tr>
<td>Roscoe Giles</td>
<td>Boston University</td>
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<td>James Hack</td>
<td>Oak Ridge</td>
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<td>Jeffry Hittinger</td>
<td>Lawrence Livermore</td>
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<td>Nelson Hoffman</td>
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<td>David Keyes</td>
<td>KAUST</td>
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<tr>
<td>Robert Voigt</td>
<td>Leidos</td>
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## Consistency in Applicants

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Applicants</th>
<th>UGPA (Average)</th>
<th>Average % GRE Verbal</th>
<th>Average % GRE Quantitative</th>
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<td>2007</td>
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<td>2008</td>
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<td>2011</td>
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<td>2012</td>
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<td>86</td>
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<tr>
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<td>342</td>
<td>3.70</td>
<td>84</td>
<td>86</td>
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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 (%)

- **Male**
  - 2013: 67
  - 2014: 58
  - 2015: 65

- **Female**
  - 2013: 12
  - 2014: 19
  - 2015: 16

- **Did Not Report**
  - 2013: 21
  - 2014: 23
  - 2015: 19
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 (%)

- African American
- Asian/Pacific Islander
- Caucasian
- Hispanic
- Multiracial
- Native American
- No Response

% of All Applicants (by year)

2015
2014
2013

0 10 20 30 40 50 60 70

0 10 20 30 40 50 60 70
2015 Screening Committee

42 members organized in teams of two.

By Employment

- DOE Lab: 40%
- Academia: 40%
- Industry: 10%
- Gov't: 10%

DOE CSGF Alumni

- Yes: 83%
- No: 17%
# 2015 Selection Committee

<table>
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<th>Organization</th>
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<td>Tom Adams</td>
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<tr>
<td>Leszek Demkowicz</td>
<td>University of Texas at Austin/ICES</td>
</tr>
<tr>
<td>Judith Hill</td>
<td>Oak Ridge</td>
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<tr>
<td>Jeffrey Hittinger</td>
<td>Lawrence Livermore</td>
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<td>Nelson Hoffman</td>
<td>Los Alamos</td>
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<tr>
<td>Ying Hu</td>
<td>Salk Institute for Biological Studies</td>
</tr>
<tr>
<td>Gianluca Iaccarino</td>
<td>Stanford University</td>
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<tr>
<td>Kary Myers</td>
<td>Los Alamos</td>
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<tr>
<td>Peter Nugent</td>
<td>Lawrence Berkeley/UC Berkeley</td>
</tr>
<tr>
<td>Sarah Richardson</td>
<td>DOE Joint Bioenergy Institute</td>
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<td>Andrew Siegel</td>
<td>Argonne/University of Chicago</td>
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<td>Robert Voigt</td>
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### Gender/Race by Application Stage

**% of total at each stage**

<table>
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<tr>
<th>Variable</th>
<th>All Applicants</th>
<th>After Screening</th>
<th>After Round 1 Selection</th>
<th>After Round 2 Selection</th>
<th>Finalists</th>
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## Discipline by Application Stage

% of total at each stage

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<th>Discipline</th>
<th>All Applicants</th>
<th>After Screening</th>
<th>After Round 1 Selection</th>
<th>After Round 2 Selection</th>
<th>Finalists</th>
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<td>Computer Science &amp; Applied Mathematics</td>
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<td>Engineering</td>
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<td>Physical Sciences</td>
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<td>28</td>
<td>38</td>
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</table>
## Academic Status by Application Stage

### % of total at each stage

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<td>Undergraduate Student</td>
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<td>Master’s Degree Student</td>
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<td>Graduate Student</td>
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<td>2+yrGS (ineligible)</td>
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</tr>
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</table>
Practicum Assignments Over Time

Practicum Count by DOE Laboratory, 1992-2014

- Ames: 41
- ANL: 80
- Bettis: 0
- BNL: 6
- Fermi: 0
- INL: 1
- Knolls: 1
- LANL: 61
- LBNL: 52
- LLNL: 2
- NREL: 35
- ORNL: 12
- PNNL: 3
- PPPL: 1
- SCRI: 1
- SLAC: 1
- SNL-CA: 23
- SNL-NM: 48
- SRNL: 0
- Other: 13
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

<table>
<thead>
<tr>
<th>Field Area</th>
<th>2015 (11)</th>
<th>Fellows (69)</th>
<th>Alumni (329)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Sciences &amp; Bioengineering</td>
<td>2 (18%)</td>
<td>18 (26%)</td>
<td>42 (13%)</td>
</tr>
<tr>
<td>Computer Science &amp; Applied Mathematics</td>
<td>2 (18%)</td>
<td>13 (19%)</td>
<td>61 (18%)</td>
</tr>
<tr>
<td>Engineering</td>
<td>2 (18%)</td>
<td>13 (19%)</td>
<td>137 (42%)</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>5 (46%)</td>
<td>25 (36%)</td>
<td>89 (27%)</td>
</tr>
</tbody>
</table>