Mentoring to Achieve Research Independence - the MATRIX Program

An R01 Preparatory Course

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### Research Project Success Rates by Type and Activity

**NIH Success Rate Definition**

<table>
<thead>
<tr>
<th>Type of Grant</th>
<th>Activity</th>
<th>Number of Applications Reviewed</th>
<th>Number of Applications Awarded</th>
<th>Award Amount</th>
<th>Success Rate</th>
<th>Fiscal Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>DP1</td>
<td>256</td>
<td>22</td>
<td>$19,791,135</td>
<td>8.6%</td>
<td>2018</td>
</tr>
<tr>
<td>New</td>
<td>DP2</td>
<td>595</td>
<td>53</td>
<td>$125,935,182</td>
<td>8.9%</td>
<td>2018</td>
</tr>
<tr>
<td>New</td>
<td>DP5</td>
<td>59</td>
<td>11</td>
<td>$4,419,684</td>
<td>18.6%</td>
<td>2018</td>
</tr>
<tr>
<td>New</td>
<td>R01</td>
<td>166</td>
<td>30</td>
<td>$52,956,819</td>
<td>18.1%</td>
<td>2018</td>
</tr>
<tr>
<td>New</td>
<td>R03</td>
<td>2,275</td>
<td>454</td>
<td>$45,060,184</td>
<td>21.7%</td>
<td>2018</td>
</tr>
<tr>
<td>New</td>
<td>R15</td>
<td>1,693</td>
<td>275</td>
<td>$116,228,232</td>
<td>16.2%</td>
<td>2018</td>
</tr>
<tr>
<td>New</td>
<td>R21</td>
<td>14,211</td>
<td>2,272</td>
<td>$504,264,747</td>
<td>16%</td>
<td>2018</td>
</tr>
<tr>
<td>New</td>
<td>R33</td>
<td>117</td>
<td>14</td>
<td>$5,860,951</td>
<td>12%</td>
<td>2018</td>
</tr>
<tr>
<td>New</td>
<td>R34</td>
<td>568</td>
<td>107</td>
<td>$27,055,859</td>
<td>18.8%</td>
<td>2018</td>
</tr>
<tr>
<td>New</td>
<td>R35</td>
<td>766</td>
<td>284</td>
<td>$134,202,660</td>
<td>37.1%</td>
<td>2018</td>
</tr>
<tr>
<td>New</td>
<td>R36</td>
<td>51</td>
<td>20</td>
<td>$1,068,101</td>
<td>39.2%</td>
<td>2018</td>
</tr>
<tr>
<td>New</td>
<td>R37</td>
<td>73</td>
<td>73</td>
<td>$35,203,062</td>
<td>100%</td>
<td>2018</td>
</tr>
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</table>
In FY 2021, the success rate for new, competing NIH R01s was 19.2%; this increased to 21.6% in FY 2022.

Established investigators and first-time PIs of R01 grants compete for the same pool of funds.

NIH recognizes a competing disadvantage for new investigators and implements mechanisms to increase their funding rate.

NIH peer review system may have flaws, but it still rewards well-crafted proposals. The logical structure of “well crafted” proposals may be unclear to new PIs.
"If you cannot see where you are going, ask someone who has been there before."
— J Loren Norris

"We make a living by what we get, but we make a life by what we give."
— Winston Churchill
Why a MATRIX Program?

- Some young faculty members do not have mentors
- Top NIH-funded universities have instituted mentoring programs to help first-time R01 applicants
## UM R01 Boot Camp Yield

<table>
<thead>
<tr>
<th></th>
<th>Pilot (Jan 2013-Jan 2014)</th>
<th>2.0 (Sept 2014-Sept 2015)</th>
<th>2016 (Jan-Oct)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of mentees completed</td>
<td>40</td>
<td>44</td>
<td>43</td>
</tr>
<tr>
<td>Mentees submitted R01-equivalents</td>
<td>34</td>
<td>37</td>
<td>25</td>
</tr>
<tr>
<td>R01-equivalents funded</td>
<td>22*</td>
<td>18*</td>
<td>10</td>
</tr>
<tr>
<td>R01 success rate</td>
<td>50%*</td>
<td>43.2%*</td>
<td>44%</td>
</tr>
<tr>
<td>Total new awards</td>
<td>100</td>
<td>77</td>
<td>39</td>
</tr>
<tr>
<td>Number of different sponsors</td>
<td>40+</td>
<td>40+</td>
<td>22</td>
</tr>
<tr>
<td>R01s pending</td>
<td>22</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>Total new funding</td>
<td>$54.2 M</td>
<td>$48.9 M</td>
<td>$34.8M</td>
</tr>
</tbody>
</table>
What is MATRIX?

- A structured, multi-tier program designed to help starting faculty get their first R01 grant or equivalent.
- MATRIX promotes a culture (mindset) of grant-writing.
- MATRIX provides the necessary ingredients to increase probability of funding.
  - seasoned, motivated coaches who guide in the writing process
  - expert feedback by Internal Subject Matter Expert
  - formal, NIH-style review by External Subject Matter Expert
Progress report

**MATRIX Pilot (2019)**
- **2 Coaches**
  - Medicine (2)
- **6 Mentees**
  - Medicine (3), CVRC (3)

DOM & CVRC, only
5 mentees submitted R01;
1 mentee left UW
3 R01 funded (60% success rate)

**MATRIX 2020**
- **12 Coaches**
  - Pathology (3), MMI (1)
  - Oncology (1); Medicine (1)
  - Engineering (1), CRB (1)
  - Radiology (1), Neuroscience (1)
  - Psychiatry (1), Pop Health (1)
- **30 Mentees**
  - Neurology (3), Anesthesiology (3)
  - MMI (1), Genetics (1)
  - Pathology (2), Engineering (1)
  - Surgery (4), CRB (1)
  - Medicine (5), Ortho/Rehab (1)
  - BMC (1), EM (1)
  - Psychiatry (1), Neurosurg (1)
  - Nursing (1), Fam Med (1)
  - Population Health (1)

Grants submitted: 15 R01/R35
Grants funded: 9 R01/R35s (60% success rate)

**MATRIX 2021**
- **10 Coaches**
  - Medicine (3), Psychiatry (1)
  - Oncology (1), Surgery (1)
  - Ob/Gyn (1), Neurol Surg (1)
  - Vasc Surgery (1), Neuroscience (1)
- **28 Mentees**
  - Medicine (4), Surgery (4)
  - BMC (1), Pop Health (1)
  - Pediatrics (2), Ob/Gyn (3)
  - Neurosurg (1), Neurology (1)
  - Fam Med (1), Orth Surg (1)
  - Orth&Rehab (1), Med Micro (1)
  - Genetics (1), Biostatistics (1), Human Onc (2), Pathology (1)
  - Ped Cardiol (1), Radiology (1)

Ended Oct 2021
Grants submitted so far: 12 R01s, 3 R21s
Overall, what other suggestions or feedback do you have on how to improve the MATRIX program?

**Answer**

“I enjoyed participating in the program and hope to have the grant completed and submitted early next year.”

“I have to state that this was an OUTSTANDING program. I had very little insight prior to starting the MATRIX program regarding the extent of effort needed to put together an R01 application. However, by starting early and meeting frequently with the coaches and other members of the team, I gained a much better understanding of what was required for a comprehensive R01 application. The MATRIX program allowed for consistent effort and progress, and a consistent reminder that progress was necessary in order to meet the expected timeline. I can unequivocally state that without this program I would have had no chance of submitting an R01 by October 2020, and the application would have been nowhere near where it ended up. I would HIGHLY recommend this program for any of my colleagues.”

“I think this is an excellent program. I didn’t get as much out of it as possible because I was not as prepared data-wise to write my application as I thought when I applied. I would consider applying again when I’m more ready for turn my R21 trailblazer into an R01 application.”

“Just keep offering it. At some point, it would be nice to write an R, and the mentors were AMAZING. Mostly, I just hope I didn’t piss them off.”

“It was really helpful to get connected with the mentors because now I feel like I have a new mentor that is much more in line with what I need than what my department was able to offer me before.”
MATRIX Program Structure

- **Coach**
- **Mentor**: “Process Expert”
- **Mentee**: R01 or other major grant applicant

"Pod"
MATRIX Program Structure

1 Coach

Mentee
Mentee
Mentee
MATRIX Program Structure

Mentor: “Process Expert”

Mentee: R01 or other major grant applicant

ISME: Internal Subject Matter Expert

ESME: External Subject Matter Expert
# MATRIX Timeline

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening Event</td>
<td>Grant Writing Seminar (Feb 2, 3)</td>
<td>Seminar: Biostatistics &amp; Budget</td>
<td></td>
<td>Mid-year Event, ISMEs included</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mock Review/ Closing Event</td>
</tr>
</tbody>
</table>

## MATRIX Administrators

- **Meet coaches**
  - Secure ISME
  - Chalk talks planned
  - Specific Aims finalized
  - Secure ESME
  - Research Strategy finalized
  - Finalize all sections and submit full draft for review to ESME
  - Revise proposal based on critiques from ESME/ ISME
  - Submit proposal (early Oct.)

## Mentees

- **Meet mentees; get to know their major areas of research and topic of R01**
  - Discuss R01/NIH basics in terms of submission, review, funding, etc.
  - Attend Chalk Talks and discuss with mentee(s)
  - Discuss Specific Aims
  - Discuss Significance and Innovation sections
  - Discuss Research Strategy
  - Discuss Research Strategy and remaining proposal sections
  - Discuss full proposal
  - Read critiques from ESMEs/ ISMEs
  - Attend and participate in Closing Event.

## Coaches

- **Mock review of “model” R01 proposals**
- **Hold monthly meetings**
- **Meet one-on-one as needed**
Expectations—Coaches

- Attend Opening Event & lead in table discussions
- Plan/attend peer group meetings; record attendance
- Advise mentees on ISMEs and ESMEs (SMEs), as needed
- Attend Chalk Talks
- Review mentees’ proposal sections
- Attend Closing Event (October TBD)
- Contact Program Coordinators with unmet needs

Get personally involved!!
Expectations—Mentees

• Attend large group events
• Attend (and participate in!) team meetings
• Review peers’ proposals
• Hold a Chalk Talk within departments or MATRIX
• Engage ISME regularly
• Obtain review from an ESME
• Submit an R01 application by fall 2023 (or shortly after)

Get funded!!
Expectations—ISMEs

- Work with mentee to develop & refine scientific strategy and proposal sections
- Attend & help select invitees to Chalk Talk
- Suggest appropriate study sections, collaborators, networking opportunities and resources
- Help mentee develop & adhere to timeline for proposal development
- Review final proposal
Expectations—ESMEs

• Review final proposal
• Provide feedback in timely manner (within a couple of weeks)
• Keep research confidential (coaches may want to help mentees choose qualified ESMEs)
Expectations — Program Coordinators/Staff

• Start and maintain files in Box for the program
• Arrange & communicate cohort activities/events
• Track mentee attendance, progress
• Send appointment letters to ISMEs & ESMEs
• Communicate with Chairs, Division Chiefs, regarding mentee progress
• Develop program-related materials, resources, & evaluation forms
• Manage payments

We strive to respond to 100% of inquiries/requests!
Financial Support

Hosting allowance

• Each Pod is allotted $500 for meeting expenses (e.g., refreshments for team meetings); $1,000 per Team.

Coach incentive

• Each coach gets $2,000/mentee assigned; payable individually (not lab account)

ISME incentive

• Each ISME gets $1,000 for his/her personal use (not lab account)

ESME incentive

• ESMEs receive $500 for providing a written critique of R01 proposal.
Questions/feedback?

Please contact the MATRIX Team:
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