Biomedical Data Translator

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NCATS

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The Issue

- Clinicians and biologists think of disease in different ways, and speak different languages
  - Physicians diagnose and treat disease based on signs and symptoms affecting specific target organs
  - Biomedical researchers think of disease in terms of molecular changes in specific proteins, pathways or cell types
The Opportunity

- A vast amount of data exist (e.g., research, health records, clinical trials and adverse event reports)

The Challenge

- These very rich yet different data sources are housed in various locations, often in forms that are not compatible or interoperable with each other
The Vision

• Accelerate development and dissemination of therapies by creating a biomedical “data translator” for the research community
• Integrate multiple types of existing data sources relevant to understanding pathophysiology
• Open source and completely publicly available
The Time Is Now

- Convergence of data science, computer science, and translational research expertise
  - Can we extract more from the data by not only gathering the data, but also integrating those data to enable new analyses
- Reclassification of disease based on molecular pathophysiology or molecular etiology could lead to
  - new intervention opportunities
  - new “patient populations”
  - more success with clinical trials
Goals for the 2-Year Program

• Feasibility and design assessment
  ➢ what will be technically and scientifically possible
  ➢ what will it cost at scale

• Identify high-value data sources

• Develop a plan for integrating across a comprehensive variety of data types.
  ➢ Identify integration barriers or data inclusion barriers

• Develop and test a plan for data quality control and data updates

• Develop a demonstration project

• Define the requirements for a comprehensive Translator
NCATS Be Nimble, NCATS Be Quick: Other Transactions Are Different

- Solicitation
- Eligibility
  - Organizations
  - Individuals
- Application content and submission includes
  - Five (5) page project plan
  - Submit via e-mail as a single PDF
- Evaluation
  - Objective review to assess science and complementarity
  - Includes in person presentations by invitees
- Implementation
  - Collaboration
  - Projects or components can be expanded, modified, partnered or discontinued
**Timeline**

<table>
<thead>
<tr>
<th>Key Events</th>
<th>Dates</th>
<th>Action needed by applicants</th>
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<tbody>
<tr>
<td>Call for projects posted</td>
<td>April 29, 2016</td>
<td>Email completed application by 5pm local time</td>
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<tr>
<td>Project applications due</td>
<td>June 1, 2016</td>
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<tr>
<td>Review of written applications completed</td>
<td>June 14, 2016</td>
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<td>Invitations to present in person sent out</td>
<td>June 15, 2016</td>
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<tr>
<td>Responses to invitations</td>
<td>June 17, 2016</td>
<td>Accept or decline invitation to present</td>
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<tr>
<td>Presentation by invited candidates in Bethesda</td>
<td>June 29-30, 2016</td>
<td>*Candidates and team attend in person</td>
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<tr>
<td>Negotiations begin</td>
<td>July 2016</td>
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*Presentation in person by at least one team member was required. NCATS provided limited travel support.*
# Feasibility Assessment Investigators

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<thead>
<tr>
<th>Organization</th>
<th>Investigator(s)</th>
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<tbody>
<tr>
<td>Broad Institute of MIT and Harvard</td>
<td>Paul Clemons, Ph.D.</td>
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<td></td>
<td>Joshua Bittker, Ph.D.</td>
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<td>Jason Flannick, Ph.D.</td>
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<td><strong>Columbia University</strong></td>
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<td>Nicholas Tatonetti, Ph.D.</td>
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<td>Chunhua Weng, Ph.D.</td>
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<td>George Hripcsak, M.D., M.S.</td>
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<td>Aris Floratos, Ph.D.</td>
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<td><strong>Institute for Systems Biology</strong></td>
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<td></td>
<td>Sui Huang, M.D., Ph.D.</td>
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<td>Gustavo Glusman, Ph.D.</td>
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<td><strong>Jackson Laboratory</strong></td>
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<td>Peter Robinson, Ph.D.</td>
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<td><strong>Johns Hopkins University</strong></td>
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<td></td>
<td>Christopher Chute, M.D., Dr.P.H.</td>
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<td>Ada Hamosh, M.D., M.P.H.</td>
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<td>Kim Doheny, Ph.D.</td>
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<td>Casey Overby, Ph.D.</td>
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<td><strong>Lawrence Berkeley National Laboratory</strong></td>
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<td>Christopher Mungall, Ph.D.</td>
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<td><strong>Mayo Clinic</strong></td>
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<td>Hongfang Liu, Ph.D.</td>
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<td>Guoqian Jiang, M.D., Ph.D.</td>
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| Oregon Health & Science University                | Melissa Haendel, Ph.D.  
Shannon McWeeney, Ph.D.  
David Koeller, M.D.  
Maureen Hoatlin, Ph.D. |
| Scripps Research Institute                        | Andrew Su, Ph.D.  
Benjamin Good, Ph.D.  
Chunlei Wu, Ph.D.          |
| St. Jude Children’s Research Hospital              | Jinghui Zhang, Ph.D.                                                          |
| Stanford University                                | Michel Dumontier, Ph.D.                                                        |
| University of Alabama                              | James Ciminio, M.D.                                                           |
| University of California, San Diego                | Trey Ideker, Ph.D.                                                            |
| University of Montreal                              | Michael Tyers, Ph.D.                                                           |
| University of North Carolina at Chapel Hill         | Stanley Ahalt, Ph.D.  
Alexander Tropsha, Ph.D.                                                    |
Kickoff Meeting October 12-14
Getting Started

- Identifying high value data sources
- Synergies across groups
- Data sharing challenges
- Developing queries
Queries

• What other pathophysiologies could drive this constellation of signs and symptoms?
• Could treatment non-responders for disease X be classified differently?
We Want Your Queries

Please send to:

Translator-questions@nih.gov
Acknowledgements

- PJ Brooks
- Shelley Brown
- Penny Burgoon
- Elaine Collier
- Megan Cowles
- Christine Cutillo
- Mariam Deacy
- Artisha Eatmon
- Stacia Fleisher
- Ken Gersing
- Taylor Gilliland
- Steve Groft
- Rajesh Guha
- Irene Haas
- Ajit Jadhav
- Carol Lambert
- Tammy Magid
- Cindy McConnell
- Pamela McInnes
- Dac-Trung Nguyen
- Eugene Passamani
- Tyler Peryea
- Lili Portilla
- Anna Ramsey-Ewing
- Julia Shriner
- Dan Tagle
- Mohan Viswanathan
- Mark Williams
- David Adams (NHGRI)
- Craig Blackstone (NINDS)
- Ian Fore (NCI)
- Susan Gregurick (NIGMS)
- Jonathan Kaltman (NHLBI)
- Jennie Larkin (OC/ADDS)
- Melissa Parisi (NICHD)
- Grace Peng (NIBIB)
- Ajay Pillai (NHGRI)
- Jeff Schloss (NHGRI)
- Chuck Venditti (NHGRI)
- Dorit Zuk (NIGMS)
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