Stewardship of the Joint Genome Institute

Nigel J. Mouncey, PhD
Director, JGI

Building Bridges Across the S&T Enterprise
NIH, Bethesda MD

June 13, 2019
The US DOE National Lab Ecosystem

* Figure does not include DOE Production Facilities

Annual Report on the State of the DOE National Laboratories. DOE. January 2017
JGI is a DOE SC User Facility

Each Office of Science user facility exists through investment by a program "owner" – the Office of Science program that provides funds through congressional appropriations for construction and operations. The decision to invest in a user facility emerges through long-term strategic planning with the scientific community to identify the research tools that will deliver the greatest scientific impact to advance the DOE mission.

Each user facility represents a substantial commitment on the part of its sponsoring program, which provides oversight and works closely with the facility management to maximize scientific impact and productivity.

A User facility is a federally sponsored research facility available for external use to advance scientific or technical knowledge.
A U.S. Department of Energy Office of Science User Facility

- Walnut Creek, CA facility opened in 1999
- ~280 staff; ~$70M annual funding

JGI MISSION: To provide the global research community with access to the most advanced integrative genome science capabilities in support of the U.S. Department of Energy’s research mission
Stewardship Principles at JGI

• **Responsible Stewardship of Resources**
  – We exercise the highest standards of financial accountability and transparency.
  – We manage all projects to the highest standards of performance.

• **Highest Research Standards**
  – We conduct research of the highest quality, with honesty, accuracy, efficiency, and objectivity.
  – We openly and objectively communicate the results of our research.
  – We commit to following a strategic plan that maximizes the impact of our research.
  – We maximize the impact of our research through collaboration, publishing, data sharing, and technology transfer.

• **Effective Leadership**
  – We thoughtfully manage and lead our staff, who are central to achieving our mission.
  – We strive to ensure a safe working environment.
  – We foster a culture of respect and collaboration for everyone in our community and advance principles of diversity, equity, and inclusion.
Stewardship Principles at JGI

• Responsible Stewardship of Resources
  – We exercise the highest standards of financial accountability and transparency.
  – We manage all projects to the highest standards of performance.

• Highest Research Standards
  – We conduct research of the highest quality, with honesty, accuracy, efficiency, and objectivity.
  – We openly and objectively communicate the results of our research.
  – We commit to following a strategic plan that maximizes the impact of our research.
  – We maximize the impact of our research through collaboration, publishing, data sharing, and technology transfer.

• Effective Leadership
  – We thoughtfully manage and lead our staff, who are central to achieving our mission.
  – We strive to ensure a safe working environment.
  – We foster a culture of respect and collaboration for everyone in our community and advance principles of diversity, equity, and inclusion.
Top Three-75% of Funding
33% Genomic Technologies (Sequencing, Synthesis, Single Cell, Metabolomics)
29% Science Programs (Program Leads & Teams/Analysis Tools)
13% Data Science & Informatics (Institutional Informatics, Systems Eng, Adv Analysis)
JGI Planning Cycle

1. **DOE BER Strategic Plan**
2. **JGI 10-Year Strategic Vision**
3. **4-Year Budget Contingency Planning**
4. **DOE Field Work Proposal (+2 YR Estimates)**
5. **Assess Current JGI Capabilities**
6. **Develop FY Budgets & Performance Metrics**
7. **Execute & Monitor Budgets/Goals**

---

**Annual**

- **Long Range**
Budget Prioritization Process

Scientific Priorities
- User Needs/Calls
- State of the Science
- Strategic Objectives
- Mission Relevance

Continuous

Budget Priorities
- DOE funding levels
- Current JGI Financial Status
- LBNL pricing rates
- Cost reductions

March->August

Capacity Planning
- Map scientific priorities to JGI capabilities
- Develop performance metrics
- Staffing levels

September

Internal Finalization
- Align capacity, metrics and resources
- Director’s Review

September

Final Budget
- Review Plans with DOE
- Budget Approval by DOE

October
### Stewardship of Capabilities

**JGI strives to continuously improve performance…**

- ~60 key performance metrics identified, tracked, and reported
- All JGI Programs and Departments
- Quarterly and Annual Goals
- Formal quarterly metrics reviews
- Corrective actions taken as needed…..

- **Green** – Acceptable  **Yellow** – Review Status  **Red** – Out of Tolerance/Corrective Action Needed

<table>
<thead>
<tr>
<th>Metric</th>
<th>Unit</th>
<th>Q1 Target</th>
<th>Q1 Actual</th>
<th>Q2 Target</th>
<th>Q2 Actual</th>
<th>Q3 Target</th>
<th>Q3 Actual</th>
<th>Q4 Target</th>
<th>Q4 Actual</th>
<th>FY17 Target</th>
<th>FY17 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungal Annotated Drafts</td>
<td>Projects</td>
<td>60</td>
<td>60</td>
<td>40</td>
<td>40</td>
<td>68</td>
<td>40</td>
<td>38</td>
<td>180</td>
<td>208</td>
<td></td>
</tr>
<tr>
<td>Fungal Annotated Drafts Cycle Time (75th Percentile)</td>
<td>Days</td>
<td>400</td>
<td>179</td>
<td>400</td>
<td>403</td>
<td>288</td>
<td>400</td>
<td>240</td>
<td>400</td>
<td>283</td>
<td></td>
</tr>
<tr>
<td>Fungal Annotated Drafts Cycle Time (Median)</td>
<td>Days</td>
<td>250</td>
<td>143</td>
<td>250</td>
<td>211</td>
<td>243</td>
<td>250</td>
<td>219</td>
<td>250</td>
<td>211</td>
<td></td>
</tr>
<tr>
<td>Genomic Tech # of Total Illumina and PacBio Bases Submitted to NCBI SRA</td>
<td>Terabases</td>
<td>26</td>
<td>12</td>
<td>18</td>
<td>34</td>
<td>36</td>
<td>28</td>
<td>30</td>
<td>100</td>
<td>112</td>
<td></td>
</tr>
<tr>
<td>Metagenome iTag</td>
<td>Samples</td>
<td>2,000</td>
<td>2,929</td>
<td>2,500</td>
<td>2,008</td>
<td>2,500</td>
<td>3,513</td>
<td>2,500</td>
<td>3,269</td>
<td>9,500</td>
<td>11,719</td>
</tr>
<tr>
<td>Metagenome iTag Cycle Time (75th percentile)</td>
<td>Days</td>
<td>80</td>
<td>161</td>
<td>80</td>
<td>133</td>
<td>80</td>
<td>69</td>
<td>80</td>
<td>78</td>
<td>80</td>
<td>91</td>
</tr>
<tr>
<td>Metagenome iTag Cycle Time (Median)</td>
<td>Days</td>
<td>50</td>
<td>104</td>
<td>50</td>
<td>61</td>
<td>50</td>
<td>63</td>
<td>50</td>
<td>39</td>
<td>50</td>
<td>64</td>
</tr>
<tr>
<td>NERSC Computing Cluster Mean Time to Interrupt</td>
<td>Days</td>
<td>&gt;20</td>
<td>46</td>
<td>&gt;20</td>
<td>25</td>
<td>&gt;20</td>
<td>37</td>
<td>&gt;20</td>
<td>37</td>
<td>&gt;20</td>
<td>36</td>
</tr>
<tr>
<td>NERSC Computing Cluster Node Availability Rate</td>
<td>Percent</td>
<td>&gt;95%</td>
<td>99%</td>
<td>&gt;95%</td>
<td>99%</td>
<td>&gt;95%</td>
<td>99%</td>
<td>&gt;95%</td>
<td>99%</td>
<td>&gt;95%</td>
<td>99%</td>
</tr>
<tr>
<td>Operations JGI Recordable Injuries (DART)</td>
<td>Rate</td>
<td>&lt;0.66</td>
<td>0.00</td>
<td>&lt;0.66</td>
<td>0.00</td>
<td>&lt;0.66</td>
<td>0.00</td>
<td>&lt;0.66</td>
<td>0.00</td>
<td>&lt;0.66</td>
<td>0.00</td>
</tr>
<tr>
<td>Operations Maintain JGI Spending w/in Forecast/Budget</td>
<td>Percent</td>
<td>90% - 105%</td>
<td>97%</td>
<td>90% - 105%</td>
<td>98%</td>
<td>90% - 105%</td>
<td>112%</td>
<td>90% - 105%</td>
<td>98%</td>
<td>90% - 105%</td>
<td>102%</td>
</tr>
<tr>
<td>Operations Operating Hours</td>
<td>Hours</td>
<td>2,164</td>
<td>2,208</td>
<td>2,117</td>
<td>2,160</td>
<td>2,140</td>
<td>2,184</td>
<td>2,164</td>
<td>2,208</td>
<td>8,585</td>
<td>8,760</td>
</tr>
<tr>
<td>Plant Diversity Samples</td>
<td>Samples</td>
<td>0</td>
<td>479</td>
<td>300</td>
<td>489</td>
<td>600</td>
<td>701</td>
<td>600</td>
<td>748</td>
<td>1,500</td>
<td>2,417</td>
</tr>
<tr>
<td>Plant Diversity Samples (75th percentile)</td>
<td>Days</td>
<td>200</td>
<td>73</td>
<td>200</td>
<td>92</td>
<td>200</td>
<td>64</td>
<td>200</td>
<td>131</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Plant Diversity Samples (Median)</td>
<td>Days</td>
<td>140</td>
<td>61</td>
<td>140</td>
<td>88</td>
<td>140</td>
<td>64</td>
<td>140</td>
<td>125</td>
<td>140</td>
<td>88</td>
</tr>
</tbody>
</table>
Developing a new vision

Strategic Documents

- JGI Vision (2012)
- JGI Update (2016)
- BERAC Vision (2017)
- LBNL BioSci Strat. Plan

Advisory Groups

- JGI Scientific Advisory Committee
- JGI Informatics Advisory Committee
- Microbial/Fungal/Plant Advisory Committees

JGI Leadership

A New Vision for the JGI
The 2018 JGI Strategic Plan

5-Year Strategic Plan
U.S. Department of Energy
Joint Genome Institute
December 2018

Beyond Basepairs
A Vision for Integrative and Collaborative Genome Science

Vision:
The leading integrative genome science user facility enabling researchers to solve the world’s evolving energy and environmental challenges
Implementation Dashboard

Input matrix for milestone owners

Tabulated Progress Charts

Visual Progress Dashboard

2-Year Milestone Status (Oct 2018 - Sep 2020)

- Complete
- In Progress or Modified (Completed portion)
- In Progress or Modified (Uncompleted portion)
- Not started
- Time elapsed

Program/Group
Genomic Technologies Department (GNT)
Microbial Genome Science Program (MGP)
Metagenome Science Program (MGP)
Fungal/Algal Genome Science Program (FGP)
Plant Genome Science Program (PSP)
Prokaryote Informatics (PKI)
Eukaryote Informatics (EKI)
Metabolomics Group (MTB)
DNA Synthesis Science Program (SSP)
Data Science and Informatics Department (DSI)
User Programs Department (USP)
Communications and Outreach (CMO)
Business Development Team (BDT)
JGI Leadership Team (JLT)
Operations Department (OPS)
JGI-Wide

Status:
- Not started
- In progress
- Modified
- Complete
- Abandoned
- Completion

Time elapsed (Oct 2018-Sep 2020)
User Programs and Science Programs

50-60%
Community Science Program (CSP)

<5%
Biological and Environmental Research Support Science (BERSS)

30%
Bioenergy Research Centers (BRC)

10%
Director's Science

<5%
Facilities Integrating Collaborations for User Science (FICUS)

Plants
Fungi
Metagenomes
Microbes
DNA Synthesis Science

Eukaryote Super Program
Prokaryote Super Program
User Program Utilization

FY15-17 Sequencing
(462 Trillion basepairs)

FY15-17 Synthesis
(13.8 Megabases)
Cross-facility initiatives: FICUS program

- Launched in 2013 to facilitate access to capabilities at JGI and EMSL
- Enables high-impact DOE science combining cutting edge capabilities by reducing administrative barriers
- Expanded in 2017 with the JGI-NERSC Microbiome Data Science call, supporting computationally intensive data analysis efforts

JGI-EMSL FICUS call

<table>
<thead>
<tr>
<th>Year</th>
<th>LOI Received</th>
<th>LOI Approved</th>
<th>Proposals Received</th>
<th>Proposals Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FY20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FY17: 30
FY18: 40
FY19: 60
FY20: 50

LOI: Letter of Intent
Measuring impact

- 1,882 primary users in 2018, up from 1,598 in 2017 (+18%)
- >8,000 data downloaders; >13,000 portal users.
- Implemented ORCID requirement for PIs; set up coordinated ORCID registration
- Created Digital Object Identifiers (DOIs) for all proposals
Annual User Survey

- Conducted annually in Nov-Dec
- All active primary users are surveyed
- Ranking of all JGI processes
- May provide comments for all items
- Several reminders sent
- Response rate ~20%
User Satisfaction Survey Helps Define Priorities

Satisfaction Benchmark – 85%

% of Users Indicating “Satisfied” or “Very Satisfied”

- Sequencing
  - Capabilities
  - Turnaround Time
  - Quality

- Synthesis
  - Capabilities
  - Turnaround Time
  - Quality

- Metabolomics
  - Capabilities
  - Turnaround Time
  - Quality

- Data Analysis
  - Capabilities
  - Turnaround Time
  - Quality
  - Data Release Policy

2016 2017 2018
People are our most valuable assets. We must grow and nurture them, enabling them to achieve a healthy, sustainable work-life balance.
3 Key Takeaways

• Critical to balance science and budget priorities with available capacity ensuring all inputs are considered
• Metrics are essential to track progress and make course corrections
• It is vital to also focus on stewardship of people

• Opportunity: Bridge building across the S&T enterprise including the DOE National Labs