Highlights of Membership Data
FY 2016-2017

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Membership Report Data

• 2016-2017 Data
  • Type of members
  • Multiple center members

• Membership Trends Over Time
  • Overview of factors affecting Membership
    • Total membership trends
      • By member type
    • Net Gain/Loss
    • Turnover
Take Home Message

• Tracking “membership” is important because it may be the most important measure of success for centers and the IUCRC program

• But...
  • We need to be very careful in interpreting changes in membership overtime
FY17 Member Fast Facts

1214 Memberships
190 new and 206 terminated memberships

$53M Provided by Members
58% of total IUCRC program funding

~17 Members per Center

Membership fee leveraging ratio 1:33
# Membership Summary

<table>
<thead>
<tr>
<th></th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total memberships</strong></td>
<td>1214</td>
<td>100%</td>
</tr>
<tr>
<td>Industry: large firms (500 + employees)</td>
<td>629</td>
<td>52%</td>
</tr>
<tr>
<td>Industry: small firms (&lt; 500 employees)</td>
<td>324</td>
<td>27%</td>
</tr>
<tr>
<td>US Government: Federal</td>
<td>144</td>
<td>12%</td>
</tr>
<tr>
<td>US Government: State or local</td>
<td>50</td>
<td>4%</td>
</tr>
<tr>
<td>Other</td>
<td>67</td>
<td>5%</td>
</tr>
</tbody>
</table>

# of organizations with memberships\(^1\) 798 --

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1. Many firms and agencies maintain more than 1 membership in the I/UCRC program. This count considers a firm or agency with multiple memberships as a single member. For example, the Army holds 20 memberships but is considered a single organization in this count.
Unique Members and Total Memberships Over Time

Growing gap between unique members and total memberships – primarily fueled by growth in firms with memberships in multiple centers.
# Membership: Organizations with the Most Memberships

<table>
<thead>
<tr>
<th>N Memberships</th>
<th>Organizations</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Army</td>
<td>• Since 2016, a significant increase in N of organizations with 5+ memberships from 27 to 33 organizations!</td>
</tr>
<tr>
<td>20</td>
<td>Air Force, NASA</td>
<td>• 24% of All memberships from these organizations</td>
</tr>
<tr>
<td>15</td>
<td>DoE, Raytheon</td>
<td>• *New to this list</td>
</tr>
<tr>
<td>13</td>
<td>Intel Corporation</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>DoD, Lockheed Martin</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Huawei, Navy</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Cisco Systems Inc, Corning Inc., DHS, Honda,</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>ERPI, IBM, NSA, Samsung, *Weyerhaeuser</td>
<td></td>
</tr>
</tbody>
</table>
## Organizations with the Most Memberships Over Time

<table>
<thead>
<tr>
<th>Year</th>
<th>1995</th>
<th>2000</th>
<th>2005</th>
<th>2010</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Name</td>
<td>N</td>
<td>Name</td>
<td>N</td>
<td>Name</td>
</tr>
<tr>
<td>10</td>
<td>Dow Chem.</td>
<td>10</td>
<td>Motorola</td>
<td>17</td>
<td>DoE</td>
</tr>
<tr>
<td>9</td>
<td>DuPont</td>
<td>9</td>
<td>Army</td>
<td>13</td>
<td>Army</td>
</tr>
<tr>
<td>8</td>
<td>3M, Motorola, Ford</td>
<td>8</td>
<td>Lucent Tech., DoE</td>
<td>10</td>
<td>Boeing</td>
</tr>
<tr>
<td>7</td>
<td>GM</td>
<td>7</td>
<td>Boeing, IBM, Honeywell</td>
<td>8</td>
<td>Intel, Air Force</td>
</tr>
<tr>
<td>6</td>
<td>Amoco, Boeing, Texas Inst.</td>
<td>6</td>
<td>Daimler Chrysler</td>
<td>7</td>
<td>Raytheon, HRL, DoD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>Ford</td>
<td>6</td>
<td>Honeywell, Navy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
<td>Dow Chem., Siemens</td>
<td>7</td>
<td>Intel, Raytheon</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>DoD, Navy</td>
</tr>
</tbody>
</table>

### Increased Defense / Defense Contractors
- Increased
- Overall Increase in Firms with Multiple Memberships

### Dropped
- Motorola, Lucent Tech., IBM, Daimler Chrysler, Ford
- HRL, Honeywell, Dow Chem., Siemens
- GM
- Huawei, Cisco, Corning, Honda, DHS, ERPI, NSA, Samsung, Weyerhaeuser, Ford, Hancock Forest Management, Hewlett-Packard, Merck, Northrop Grumman, Qualcomm, Bayer, Campbell Global, Dell, DuPont, L3, Rayonier, Toyota

### New
- Lucent Tech., IBM, Honeywell, Daimler Chrysler, DoD
- Intel, Air Force, Raytheon, HRL Labs, Dow Chem., Siemens, Navy
- Lockheed Martin, NASA, GM, IBM
- Huawei, Cisco, Corning, Honda, DHS, ERPI, NSA, Samsung, Weyerhaeuser, Ford, Hancock Forest Mgmt., HP, Merck, North.Grumm., Qualcomm, Bayer, DuPont, Campbell Global, Dell, L3, Rayonier, Toyota
Member Composition 2005-2017*


^ Categories comprising Others include: non-profit, non-US gov’t, and other org.
Interpreting Membership Changes Over Time
Interpreting Membership Changes Over Time

• Changes in Membership numbers over time are influenced by changes at different levels:
  • Members: Individual members will leave a center and new members will be added
  • Centers: Mature centers will graduate (and their members will be dropped) and new centers will be created (and their members added)
  • Sites: New sites (and their members) are added to existing centers

• Changes in program totals and averages per center can be due to any combination of these factors
Example: 2012 IUCRC System Changes

Note: Rows are mutually exclusive

<table>
<thead>
<tr>
<th>Level of Change</th>
<th>2011</th>
<th>2012</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ctrs</td>
<td>Sites</td>
<td>Mbrs</td>
</tr>
<tr>
<td>CENTERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In</td>
<td>+7</td>
<td>+15</td>
<td>+95</td>
</tr>
<tr>
<td>Out</td>
<td>-4</td>
<td>-6</td>
<td>-21</td>
</tr>
<tr>
<td>SITES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In</td>
<td>3</td>
<td>+3</td>
<td>+20</td>
</tr>
<tr>
<td>Out</td>
<td>5</td>
<td>-5</td>
<td>-28</td>
</tr>
<tr>
<td>MEMBERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In</td>
<td>42</td>
<td>0</td>
<td>+203</td>
</tr>
<tr>
<td>Out</td>
<td>41</td>
<td>0</td>
<td>-206</td>
</tr>
<tr>
<td>No change</td>
<td>2</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>NET IMPACT</td>
<td>+3</td>
<td>+7</td>
<td>+63</td>
</tr>
</tbody>
</table>

2011: 54 Centers, 161 Sites, 1030 Members

2012: 57 Centers, 168 Sites, 1093 Members
Membership Turnover Variables and Indicators

• **Members added:** number of members center reports adding during past year (may include new individual members or members from added site)
  - Does not include addition of new centers

• **Members left:** number of members a center reports leaving the center during past year (would only include site-level loss if site left center)

• **Member Net Gain/Loss:** the relative gain or loss of members (members added – members left) centers experience during each calendar year

• **Member Turnover:** percentage of a center’s members from year x that leave the center the following year (year x + 1)

• Aside: Other membership indicators we’ve looked at:
  - Dwell time, turnover by center fidelity to IUCRC model, membership for single vs. multi-site centers, private vs public sector membership, fortune ranking of members, defense membership, phase based growth and retention, firms with multiple memberships, Chinese firm membership
Total Members and Average Memberships per Center by Year

**Total Number of Memberships**

**Avg. Number of Memberships per Center**

Complex Changes:
- **2011-2014**: Massive growth in new centers established ($N=31$), decreasing average
- **2017**: Graduation of 3 highly successful Phase III centers, decreasing the average
Industrial Memberships by Center Phase

**Total Number of Memberships**

- Phase I (N=29)
- Phase II (N=32)
- Phase III (N=9)

**Average Number of Memberships**

- Phase I (N=29)
- Phase II (N=32)
- Phase III (N=9)

IUCRC Evaluation Project
Average Membership Gain/Loss

Economic Downturns

Economic uncertainty? Program-level factors?

Members Added this FY  Members Left this FY

IUCRC Evaluation Project @ NCSU
Membership Turnover Rate

Turnover % = Members terminated in year X+1 / Total members in year X

New normal: Centers lose 15-20% of their memberships from one year to the next.
Conclusions: Turnover

- Membership growth and stability
  - Average number of members has been relatively stable, decreasing slightly, over the last 5 years; ~18 members/center
    - Closer to ~15 members/center if you exclude Advanced Forestry as an outlier with 148 members
  - Member turnover rate is at a new normal of 15-20% over the last 10+ years
  - Significant increase in organizations with 5+ memberships

- Membership is dynamic
  - Program level picture positive based on continuous growth in new centers and sites
  - Most fluctuations attributable to initiation of Phase 3 funding opportunity and graduation of Phase 3 mega-centers
  - Membership picture is volatile
    - Causal factors are hard to pin down
    - Explanations may reside with center level variables like leadership, technology salience, as well as structural issues like the churn of old and new centers, site transitions, etc.
    - Useful both as a measure of overall program health and to benchmark center performance relative to program level norms