Committee members:

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Lisa Leiden, Director, Office of Responsible Research (until 1/14/16)
Balaji Narasimhan, Professor of Chemical and Biological Engineering
Adam Schwartz, Director, Ames Laboratory
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1. Overarching Goal: Enhance Iowa State University’s research profile

Excellent faculty, a stimulating and collaborative climate, a clear strategic focus and a balance of depth and breadth are the key drivers of a university’s research excellence. Measurable outputs, such as success in attracting external funding, garnering prestigious awards and recognitions, publishing in high-impact venues, and graduating PhD students depend critically on the intellectual talent and collaborative mindset of the faculty. Our recommendations are designed to attract and retain excellent faculty and help them reach their highest creative potential and impact.

As an AAU institution, we need to sustain excellence across a broad range of academic fields, and that requires a baseline of support. Yet, in a resource-limited environment, investments must necessarily be strategic, designed to create the largest possible impact. A clear understanding of ISU’s unique strengths and partnerships, e.g., with the Ames Laboratory or the USDA facilities located in Ames, is essential as part of this process.

The committee recommends that the university engage in a transparent and inclusive process to identify a few (three or four) interdisciplinary strategic priority areas in which ISU can be an undisputed national and international leader. The committee also recommends that the university design a framework or support mechanism which will allow new interdisciplinary areas to emerge and gain strength. Finally, the committee recommends that the selected strategic priority areas should be reviewed regularly, based on generally accepted metrics of success.
While these recommendations necessarily focus investments, we believe that the university’s current strengths are sufficiently broad as to allow participation from all colleges. A natural outcome of this process will be enhanced interdisciplinary collaborations, increased competitiveness for collaborative and center-type proposals, and avenues for integrating new faculty into collaborative research programs and funding streams. Faculty across all colleges will also benefit from infrastructure improvements, e.g., enhanced support for grant writing, award nominations or the availability of new facilities and equipment.

An inclusive campus climate which attracts a diverse faculty and student body will support and increase ISU’s research productivity. As numerous studies show, diverse teams are more creative and generate more successful solutions to important challenges, due to the wider range of professional and life experiences that they bring to their work. In an inclusive and diverse environment, undergraduate and graduate students will learn how to work effectively and collaboratively with people from different backgrounds, as part of preparing for successful professional and personal lives.

2. Overall Performance Measures that will be used to track progress on the overarching goal during the next six years

- Total research expenditures, including extramural funding and internal research support
- Number and percent of faculty with prestigious national level awards
- Number of publications in high impact venues and number of citations

These performance measures were selected specifically to address those areas in which our rankings as an AAU member institution will benefit most from focused interventions.

3. Specific Measurable Actions and corresponding performance metrics related to the overall performance measures. These are the specific actions that the university will take/implement to move the needle on the overall performance measures. (You may submit 1-2 actions per performance measure, but no more than 3 total).

- Measurable action: Diversify Iowa State’s research portfolio and enhance competitiveness of ISU proposals
  Performance metric: Double our research expenditures

- Measurable action: Develop targeted strategies to attract and retain excellent faculty
  Performance metric: Double the number of National Academy members on the ISU faculty and coordinate the hiring of 30-40 junior and mid-career faculty in research priority areas (10-12 per area)

- Measurable action: Develop mentoring and support structures (e.g., a “high impact publications hub”) to help faculty become more successful in publishing in high impact venues (journals, publishers)
  Performance metric: Double the number of publications in high impact venues and increase the number of citations per faculty member by 50%
4. A list of additional metrics that are related to the overarching goal (e.g., six year graduation rate). These additional metrics will not be in the body of the strategic plan itself, but rather will be categorized by overarching goal as a supplement to the strategic plan.

**Measurable action: Diversify Iowa State’s research portfolio and enhance competitiveness of ISU proposals**

There are many measures of success for research-active faculty at a major university, but the gold standard at the institutional level is the ranking of universities by their research expenditures. While a variety of historical factors and institutional characteristics impact those rankings in ways that are not easily changed, there are many avenues which would increase our success rate in a highly competitive environment. The university has already taken key steps towards this goal, and our recommendations are designed to emphasize their importance and build on them further.

Federal research funding has not kept pace with inflation, and grants are becoming increasingly competitive, with funding rates now routinely below 10%. It is therefore critically important to establish and sustain a diversified research portfolio, combining a variety of federal funding sources with state, corporate, and foundation support. It is also essential to continue to enhance the competitiveness of large proposals, through pre-award support and seed funding initiatives, to generate preliminary data and perform proof-of-principle research.

Objectives and tactics:

- **Diversify Iowa State’s research portfolio**
  - Continue to enhance pre-award support (e.g., the “Grants Hub”)
  - Target more non-federal and currently underutilized federal funding
  - Collaborate more actively with the ISU Foundation to identify additional funding opportunities through foundations and philanthropy
  - Leverage unique competitive advantages offered by the presence of national laboratories (Ames Laboratory, USDA labs) in Ames
    - Find ways to reflect appropriate Ames Laboratory research expenditures in ISU figures

- **Enhance competitiveness of proposals**
  - Improve networking with funding agencies and foundations
  - Develop a process for red-teaming large proposals
  - Incentivize cross-disciplinary collaborations and the formation of new centers, combined with clearly formulated expectations and metrics for success
  - Increase success rate of all proposals
  - Support high-risk, high-reward scholarship through internal seed funding opportunities; define expected return on investment in terms of successful proposals
  - Encourage multi-institutional proposal development

Metrics:

- Total research expenditures
- Competitive federal funding
- Ratio of non-federal to federal funding
- Success rate of all proposals
Measurable action: Develop targeted strategies to attract and retain excellent faculty

Our approach to hiring new faculty must become more strategic, proactive, and coordinated. Search committees need to cultivate and develop candidate pools as much as evaluate them. High caliber applicants must be proactively identified and recruited. Searches across units with related interests should be better coordinated in order to attract candidates whose work is interdisciplinary and can benefit more than one department or college. Deans and chairs need to assess the satisfaction of high performing faculty on a continuous basis and proactively ensure their retention.

Objectives and tactics:

- Develop coordinated targeted strategies to attract excellent faculty
  - Promote current and recruit new faculty in a dual-pronged approach to increase the number of national academy members
  - Increase efforts to hire emerging stars, i.e., early mid-career faculty with a strong track record
  - Improve collaboration between units to coordinate and leverage hires in related research fields; consider establishing umbrella committees to coordinate multiple searches with a common vision and to provide better communication regarding all ongoing searches across campus
  - Tie hiring initiatives to research priority areas
  - Pay attention to candidates with families for whom Ames would represent a compelling destination – leverage recent ‘best small city’-type publicity
  - Develop a competitive strategy for attracting excellent faculty from higher ranking institutions
  - Advertise and recruit intentionally to encourage diverse applicant pools, including members of underrepresented groups

- Develop intentional strategies to support and retain high-performing faculty
  - Consistently evaluate and address the compensation and satisfaction of high performing faculty, to mitigate the risk of their departure
  - Identify the top group of researchers/scholars across each college and provide them with the resources needed to double their research productivity; also identify the next tier of researchers/scholars across each college and provide them with resources and mentoring to reach their highest potential in research productivity
  - Promote active and strategic nominations of faculty for AAU class awards
  - Continue to promote faculty awareness of the standard measures of faculty scholarly productivity and how to enhance them

Metrics:

- Number of AAU class awards received each year
- Number of AAU “stepping stone” awards received each year (e.g., professional society awards)
- Number of early to mid-career faculty with early career awards

Measurable action: Develop mentoring and support structures (a “high impact publications hub”) to help faculty become more successful in publishing in high impact venues
High impact publications play a critical role in making the research of ISU faculty visible to the wider research community and enhancing ISU’s research reputation. Such prominence helps faculty garner invited talks, funding, and awards, and makes the university more attractive as a partner institution and workplace. Providing open access to scholarship, by publishing in open access venues or depositing publications in open access repositories like the Iowa State Digital Repository, increases the visibility and accessibility of research conducted at Iowa State.

Objectives and tactics:

- Increase citations and impact of Iowa State research and scholarship
  - Support publications in high impact open access journals
  - Increase faculty participation in the Iowa State Digital Repository
  - Ensure compliance with federal granting agencies’ public access mandates for publications and data
- Increase faculty participation on editorial boards of high impact journals
  - Advocate for open access publishing options and flexible self-archiving policies
- Provide adequate staff and resources to ensure sustainability of research outcomes with ongoing informational and research value
- Build on efforts like Futurity to increase publicity for research conducted at Iowa State, incorporating social media and other emerging communication channels

Metrics:

- Publication citations and altmetrics (including repository download counts)

Measurable action: Build and maintain a personnel and physical infrastructure designed to enhance research

A functioning and up-to-date research infrastructure enhances all aspects of the mission of the university: It enables high quality research by faculty and students, influences hiring top researchers and therefore attracting top graduate students, and undergraduates through REUs and other career supporting activities. Currently, Iowa State’s budget model does not have a specific process to fund functioning and up-to-date research infrastructure.

Objectives and tactics:

- Build and support broad research initiatives, centers, and institutes in collaboration between departments, colleges, and central administration, including
  - Identify national priorities and grand challenges relative to existing and planned ISU research strength
  - Develop interdisciplinary research groups in areas of need and strength
  - Support promising initiatives via seed funding, and key research centers/institutes via base funding
  - Develop life cycle rules and support for centers/institutes
- Build and support functioning and up-to-date research facilities, including
  - Take inventory of existing research facilities and recognize gaps
  - Develop prioritized list for (deferred) maintenance and remodeling of existing research facilities
Create new shared facilities, such as greenhouses, wet labs, computational and communication labs, and maker spaces
- Develop innovative funding programs for critical research facilities

- Build and support functioning and up-to-date research instrumentation
  - Take inventory of existing research instrumentation and recognize gaps
  - Develop prioritized list for acquisition of research instrumentation
  - Develop funding programs for critical research instrumentation
  - Develop shared instrumentation and fee-for-service guidelines that allow for cross-campus use of key instrumentation

- Continue to build research support infrastructure, including
  - Grant coordinators at departmental, college, VPR level
  - Technical support staff for shared instrumentation and facilities (e.g., plant growth facility and nursery)
  - OSPA, SPA
  - University Library
  - Compliance areas
  - IP and engagement
  - Project management and post-award services
  - Programs that attract outstanding graduate students and postdocs

Metrics:
- External funding for centers/institutes
- Creation of new centers/institutes with substantial external support
- Funding plan for research facilities and instrumentation

**Measurable action: Attract and retain excellent graduate students and postdocs**

Discovery is at the heart of learning and scholarship, creating an intrinsic driver for institutional excellence that infuses all research, teaching and outreach. While faculty lead the campus in framing and leading discovery activities, the postdoctoral fellows and graduate students we attract and engage are both receivers and contributors to the research endeavor. Recruitment and retention of diverse, high quality students to join faculty on the path of discovery is a necessary foundation for the expansion of Iowa State University’s research footprint.

Objectives and tactics:
- Build and maintain a cohesive array of resources and programs to attract and retain great students and postdocs
  - Facilitate cooperation among central units and between collegiate units to maximize access to support programs and resources.
  - Continue to support the Graduate College in recruiting efforts, building community amongst graduate students and postdocs, supporting students through transitions, and providing professional development at critical times during the training period.
  - Continue Graduate College led efforts to empower departments to increase communication with prospective students, especially those from underrepresented groups
  - Consider creating named postdoctoral positions to attract outstanding junior scientists to our research programs
• Improve campus climate to create a supportive environment and inclusive environment for all students
  o Consult with students from underrepresented groups to explore and understand their experience and promote inclusion
  o Empower students, faculty and support staff to craft initiatives to enhance a supportive and inclusive campus climate
  o Track campus climate through regular and rigorous assessment
• Develop innovative, boundary breaking initiatives to attract new types of graduate students
  o Support units and faculty in developing trans-disciplinary research initiatives and programs of study that provide appealing opportunities for the next generation of graduate students
  o Secure industry and federal support for graduate student projects and study in these areas
  o Disseminate results of trans-disciplinary graduate student activities through appropriate peer reviewed venues and awards programs
• Build a pipeline of strong graduate students by encouraging undergraduate research
  o Increase opportunities for undergraduate students to learn about and engage in scholarly communication
  o Publicize and recognize undergraduate research
  o Provide support and mentorship for students who are interested in research

Metrics:
  • Diversity of graduate student body as a percentage of enrolled students
  • Amount of investment in graduate student support
  • Retention of graduate students and degree completion rates
  • Assessment data related to campus climate
  • Increased graduate student enrollments within transdisciplinary/emergent research areas
  • Peer reviewed publication and other honors and recognitions of graduate student research
  • Number of undergraduate students engaged in research opportunities
  • Number of undergraduate student publications and conference presentations