

APPENDIX 1A

The Grand Challenges

Grand Challenge Initiatives: These are long-term “Big and Bold” research programs that address critical national and international quality of life issues by establishing trans-disciplinary teams of faculty and students who work in collaboration with Indianapolis and Indiana communities and citizens. Develop at least one new Big and Bold project of this type within the next 3-5 years

One recent initiative of the Obama Administration, an element of the President’s *Strategy for American Innovation*, is to promote and expand the research that universities are doing by encouraging them to identify and pursue “ambitious but achievable” research programs that require collaborations with industry, local and state government, and not-for-profit community organizations. These “Big and Bold” research programs are called Grand Challenges, and are intended to couple innovative science and technology to address important national or global problems that are difficult to solve through individual investigator-initiated research. The Grand Challenges are expected to “catalyze breakthroughs that advance national and global priorities,” create new jobs and whole industries, and expand the human knowledge base.

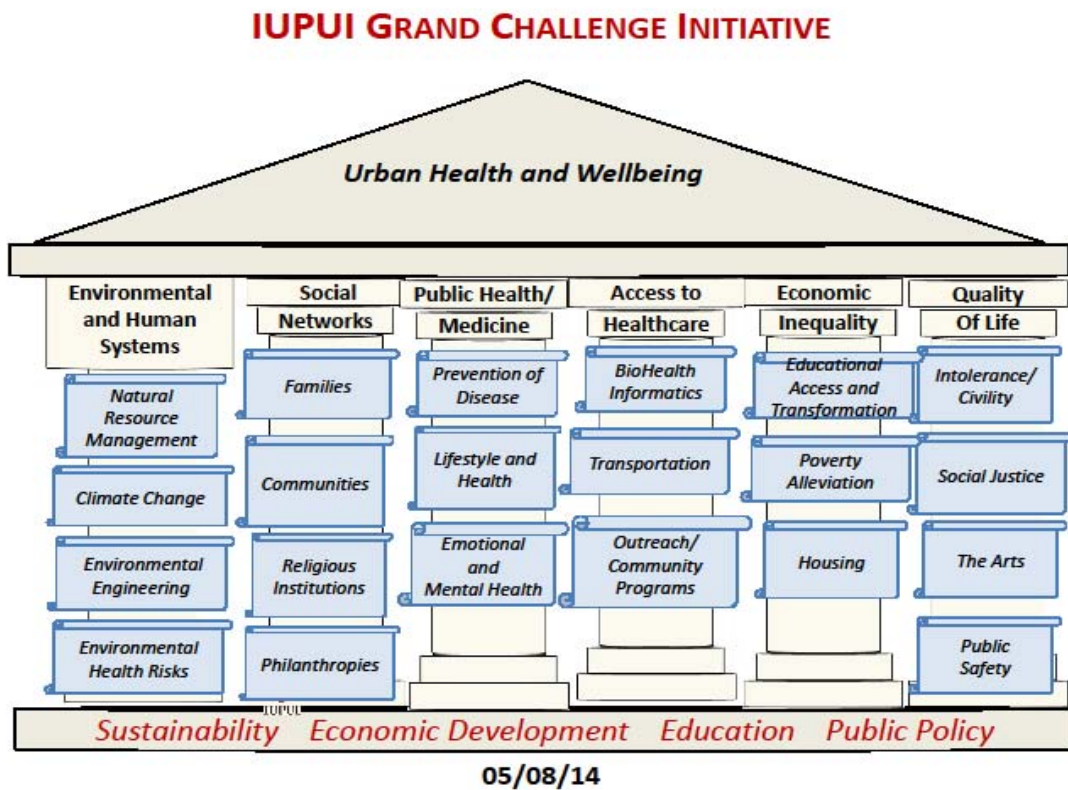
Urban Health and Wellbeing (UHW) has been identified as IUPUI’s first Grand Challenge Initiative. Its vision is *to serve humanity through betterment of health and wellbeing of urban communities in Indiana and beyond*. Its mission is *to enhance through innovative and coordinated research, education, and strategic partnerships the health and wellbeing of the Indianapolis community, establishing a national model to holistically address major challenges faced by urban communities in Indiana and beyond*.

The UHW Grand Challenge has six pillars, which represent broad areas of research emphasis (Figure 1). These include research into Environmental and Human systems; Social Networks; Public Health and Medicine including Access to Healthcare; Economic Inequality, and Quality of Life issues. Each of these pillars includes several more focused areas of potential research that cross disciplinary boundaries. The pillars are not isolated silos, but display in graphic format the many opportunities to cross disciplines to form new collaborative arrangements. These areas rest on the foundations of Sustainability, Economic Development, Education and Public Policy, which are components of all areas.

The UHW Grand Challenge will focus IUPUI’s energies on clear, targeted goals that maximize the University’s potential to compete nationally for highly-competitive research grants. This will be accomplished through support for the development and implementation of effective research programs that involve collaboration among IUPUI, industry, governmental and community agencies. It is expected that the “Grand Challenge Initiatives” will foster the growth of major high-impact and synergistic trans-disciplinary research and creative activities at IUPUI that are well supported by external funding sources. Locally, the Grand Challenge is intended to foster a campus culture of inquiry, creativity, and inclusiveness that will encourage faculty to engage in high-quality research and creative activities with each other, their students, and the community at-large. The result of the successful Grand Challenge Initiative will be to improve the lives of Indianapolis residents through better healthcare, higher quality of life, enhanced education,

increased access to economic opportunities, and more effective social networks. In part this will be accomplished by establishing a multi-service health and wellbeing community hub with supportive networks in collaboration with partnering entities in Indianapolis. As the research and collaborations develop, IUPUI will disseminate its findings and share best practices with urban communities in Indiana and beyond with the goal to sustain an improvement in the quality of urban life for everyone.

Figure 1. Schematic overview of the *Urban Health and Wellbeing* IUPUI Grand Challenge.



APPENDIX 1B

(1) Launch “Grand Challenge Initiatives”

Goal 1.1: Develop an Urban Health and Wellbeing (UHW) Grand Challenge within the next 3-5 years.

Timeline and Benchmarks for Success

- (1) By 2016: the Director, Operations Manager, and clerical support for the first Grand Challenge (UHW) have been appointed
- (2) By 2016: a plan resulting in the training of a core of IUPUI investigators in participatory community research has been developed and executed
- (3) By 2016: a community hub is staffed and operating in Indianapolis
- (4) By 2017: increase in peer-reviewed publications or other scholarly works identified as a component of the first Grand Challenge (requires establishing a baseline in 2015)
- (5) By 2017: significant philanthropic support for the UHW Grand Challenge has been secured
- (6) By 2017: working relationships with relevant local and state governmental agencies in support of the UHW Grand Challenge have been expanded
- (7) By 2018: all administrative costs for the Director, Operations Manager, and clerical support for the first Grand Challenge (UHW) are supported through indirect cost return from related external awards.
- (8) By 2019: Signature Centers associated with the first Grand Challenges will be self-supporting administratively through return of indirect costs.
- (9) By 2020: the operational infrastructure and internal funding mechanisms for the second Grand Challenge initiative has been established.

Primary Responsibility: Office of the Vice Chancellor for Research (OVCR)

Costs (Annual)

These costs are estimated based on the initial, single Grand Challenge. These costs would be duplicated for each additional Grand Challenge.

Operational (50% Director, 100% Operations Manager, Clerical support)	\$325,000
Internal Funding for Centers related to Grand Challenge, 2/yr*	100,000
Pilot Project program related to GC areas, @ \$50,000/Topic Area	250,000
Community Hub – physical presence	150,000

* Each Center is supported by the OVCR at \$50,000/yr; matching funds of \$50,000/yr are provided by the units supporting the centers in the Signature Centers Initiative.

TOTAL ANNUAL COSTS: \$825,000

Goal 1.2: Improve and expand *cross-sector and translational* research activities and initiatives with industry, government, nonprofit and other community partners to address important local, national, and global needs.

Timeline and Benchmarks for Success

- (1) By 2016: A Faculty Learning Community for cross-sector and translational research to cultivate faculty leadership and mentorship for cross-sector and translational research and scholarship has been established
- (2) By 2016: A comprehensive campus plan for cross-sector research will have been created, which includes an active database of community-engaged researchers and scholars and impact measures for cross-sector research
- (3) By 2016: Increase in numbers of cross-sector partnerships including identification of new external partners (establish a 2015 baseline)
- (4) By 2016: Increase in the number of faculty and staff involved in cross-sector research and identified as translational scholars (establish a 2015 baseline)
- (5) By 2016: Recognition of cross-sector researchers at campus events
- (6) By 2016: an operations manager for the collaboratory is hired who will develop an information network in partnership with the University Library (see goal 5.2) to capture faculty scholarship
- (7) By 2017: Increase in peer-reviewed publications or other scholarly works related to cross-sector research (establish a 2015 baseline)
- (8) By 2017: Roll out of the collaboratory database and network system in partnership with the IUSM Industry Collaboration Portal and the Office for Research Administration
- (9) By 2018: New multidisciplinary cross-sector research partnerships have secured substantial external funding
- (10) By 2018: Identify at least five success stories demonstrating the real impact of community-engaged research on community programs/development
- (11) By 2018: Increased number of faculty and staff engaged in commercialization and start-up company efforts (establish a 2015 baseline)
- (12) By 2019: IUPUI will host a national conference highlighting cross-sector research

Primary Responsibility: Office of the Vice Chancellor for Research (OVCR) in collaboration with the Office of Community and Regional Engagement

Costs (Annual)

Conference funds for national conference on engagement	\$10,000
For collaboratory:	
Development of information systems (<i>one time only</i>)	\$30,000
OVCR Operations Manager for collaboratory	125,000
Support/clerical staff	70,000

TOTAL ANNUAL COSTS \$205,000 (+ one-time \$30,000 development cost)

APPENDIX 2

(2) Expand cross-disciplinary faculty research at IUPUI

Goal 2.1: Advocate for promotion and tenure guidelines that align faculty rewards with campus goals.

Timeline and Benchmarks for Success

- (1) By 2016: Formal written incentives have been developed within Schools to encourage faculty to engage in team science
- (2) By 2016: The current system for Faculty Annual Reports will have been entirely re-organized to more easily track faculty research contributions, especially those that are collaborative
- (3) By 2016: The P&T guidelines have been revised and are being implemented
- (4) By 2019: significant increase in the number of faculty being promoted on the basis of collaborative work, nontraditional forms of publication, and/or translational research and creative work

Costs

Monetary costs would depend on the extent to which the campus wishes to provide financial rewards and incentives for entrepreneurial and translational work, creative work, team scholarship, and public scholarship. Costs for this initiative are rather viewed in terms of human capital and the significant amount of faculty and staff time that will be required to re-evaluate, discuss, and re-write promotion and tenure guidelines. Although this can be supported and encouraged by the OVCR, the initiative must be driven centrally by campus administration and by each School individually. However, the OVCR will advocate for the Promotion and Tenure Committees to consider publications and grants reflecting team science as a desired outcome for both promotion and tenure.

Primary Responsibility: IUPUI Office of Academic Affairs

Goal 2.2: Provide guidance to schools to conduct coordinated recruitment

Timeline and Benchmarks for Success

- (1) By 2016: New mechanisms for coordinating faculty recruitments across schools have been established. The Office of Faculty and Academic Affairs (FAA) will be pro-active in collecting information from the schools on their hiring priorities for each recruitment season and will seek to identify areas of overlap or synergy, particularly those aligned with priorities such as the Grand Challenges.
- (2) By 2016: A pool of funds to facilitate cluster hires and high priority recruitments has been established. Schools wishing to solicit other schools to partner in recruitment will pay into the fund for a particular hire, with equivalent campus match provided if the hire is in a high priority area.

Costs (Annual)

Actual costs will depend on which areas the campus decides to promote, which Schools these are in (startup costs vary considerably across disciplines), and how many faculty the campus determines is necessary to form a critical mass. Assuming an average cost of \$200,000 per faculty member for startup costs, and an average of three cluster recruitments per year, and assuming that 50% of the costs would be borne by the School/Department that is recruiting, then an estimated cost to the campus could be \$300,000/year.

Primary Responsibility: Office of the Vice Chancellor for Research (OVCR), Office of Academic Affairs, and the Schools

Costs (Annual)

Cluster recruitment, 3/yr at \$200,000 ea, shared 50% with Schools \$300,000

TOTAL ANNUAL COSTS: \$300,000

Goal 2.3: Explore new strategies and incentives to support research/scholarly productivity among all faculty.

Timeline and Benchmarks for Success

- (1) By 2015: A policy for return of a portion of ICR to campus designated/recognized Research Centers for extramurally funded proposals has been established and is being implemented.
- (2) By 2016: Salary savings programs within the Schools have been established.
- (3) By 2016: A system that allows pooling and/or leveraging of internal resources from several different school- and campus-based sources has been established.
- (4) By 2016: Benchmarks to be evaluated against faculty research productivity/creative activity in baseline years 2005, 2010, 2014 and 2015 have been developed based on Faculty Annual Reports.
- (5) By 2019: Parallel increases in indirect dollars returned to the faculty, and an increase in salary savings programs by the Schools is documented

Primary Responsibility: Office of Academic Affairs; Office of the Vice Chancellor for Research (OVCR)

Costs (Annual)

Development/modification of existing software for Faculty Annual Reports	50,000
Tracking productivity and develop reports with appropriate metrics	15,000
Enhance administrative capacity to support pooling of internal funding resources for grant applications	25,000

TOTAL ANNUAL COSTS: \$90,000

APPENDIX 3

(3) Expand and integrate research experiences for undergraduates across all disciplines through the Grand Challenge Initiatives

Timeline and Benchmarks for Success

- (1) By 2016: All undergraduate degree granting schools will have at least one first-year course tied to Grand Challenge questions, utilizing course-based or “authentic research”
- (2) By 2017: The Grand Challenge Scholars program and an associated effective assessment strategy for documenting learning outcomes and student success will be well integrated with the Grand Challenge initiative and a functioning part of the campus-wide effort to develop strong community-relevant research.
- (3) By 2017: IUPUI will have an active student-run Innovation and Entrepreneurship Center (IEC)
- (4) By 2018: Paralleling benchmarks for the Grand Challenge Initiative, the number of undergraduates involved in institutionally sponsored mentored research will double (from 200 to 400 students)
- (5) By 2018: The number of students from under-represented populations involved in institutionally supported mentored research will double, from forty students to 80 students.
- (6) By 2019: The number of students in the Diversity Scholars Research Program will double from 26 to 52.
- (7) By 2020: At least 100 students from under-represented minorities will be conducting mentored research tied to Grand Challenge initiatives.
- (8) By 2020: IUPUI undergraduates will have had the opportunity for at least one experience tied to the Grand Challenge Initiative (either through course-based projects or mentored research projects, internship or other RISE experiences).
- (9) By 2020: The student IEC will be self-sustaining through community and corporate sponsorship

Primary Responsibility: Center for Research and Learning (CRL)

Costs (Annual)

Grand Scholars Program, 8 teams of 5 students @ \$20,000	160,000*
Doubling of Diversity Scholars Research Program (to 52 by 2019)	249,600**
<u>TOTAL ANNUAL COSTS:</u>	<u>\$409,600</u>

* funded through the Office of Academic Affairs; estimate based on current cost of a MURI team (\$20,000)

** funded through the Office of Academic Affairs; cost for an additional 26 students (based on a per student cost of \$9,600 per year)

APPENDIX 4

(4) Develop nationally recognized graduate programs in critical areas that cross disciplinary boundaries and expand campus capacity for graduate education

Timeline and Benchmarks for Success

- (1) By 2016: Establish the baseline data to document how many students are in cross-disciplinary programs.
- (2) By 2016: Increase the number of students in cross-disciplinary tracks by 10%/year both with students switching from single to cross-disciplinary tracks and with new students who applied directly to the cross-disciplinary track.
- (3) By 2016: Increase funding for PhD students working in the area of the Grand Challenge.
- (4) By 2016: At least four PhD programs will have faculty and students working collaboratively on research related to the Grand Challenge.
- (5) By 2016: Advisory Boards in partnership with community agencies have been established and have identified research questions of interest to the community or industry.
- (6) By 2017: PhD programs graduating fewer than 5 students in three years will have been expanded or absorbed into larger programs by taking advantage of opportunities afforded by work on the Grand Challenge.
- (7) By 2017: Increase both the number of applications received for programs associated with the Grand Challenge and the number of students who matriculate into these programs by 20%.
- (8) By 2017: PhD students are being routinely placed into paid internship/research positions in partner institutions outside IUPUI, working on projects that serve as part of the student's dissertation project.
- (9) By 2018: IUPUI will have doubled the number of extramurally sponsored Training Grants compared to 2014.
- (10) By 2020: Document the effect of cross-disciplinary training on job placement success by following career paths for students graduating from the cross-disciplinary tracks versus single tracks. Indicators include: placement rate, array of jobs offered, placement into permanent positions, or job satisfaction reported by placed students.

Primary Responsibility: IUPUI Office of Graduate Affairs

Costs (Annual)

The initial costs would be in faculty time to develop the plans of study and the proposals for official cross-disciplinary tracks, as well as staff time in the Graduate Office to assist getting these changes institutionalized.

Fellowships for PhD students working in the area of the GC (4 programs, 2 students ea., full support incl. tuition, insurance, stipend)	400,000
Development of T32 or other training programs within the GC (Assuming matching funds, 0.25 FTE faculty administrator & 0.5 FTE staff support)	75,000
Central coordinator, faculty fellow, 0.5 FTE	50,000
Data gathering and analysis, assessment, staff, 0.5 FTE	25,000

TOTAL ANNUAL COSTS: \$550,000

APPENDIX 5

(5) Encourage wider access to findings and applications from research at IUPUI

Goal 5.1: Grow effective communication about campus-wide research activities

Timeline and Benchmarks for Success

- (1) By 2016: A communication expert has been hired in OVCR.
- (2) By 2016: 30% increase in the number of visitors to the OVCR website as a result of it being restructured and updated
- (3) By 2017: 50% increase in the number of IUPUI research related stories covered by external media outlets
- (4) By 2017: IUPUI has improved its national rankings as an urban research university

Primary Responsibility: Office of the Vice Chancellor for Research (OVCR)

Goal 5.2: Facilitate and increase dissemination of research and scholarship

Timeline and Benchmarks for Success

- (1) By 2016: An enterprise network software operator system (UCI) will be identified for dissemination of research and scholarship among IUPUI faculty.
- (2) By 2016: All faculty have been introduced to opt-out open access policies and self-archiving support service on campus.
- (3) By 2016: The IUPUI Open Access Fund is refunded and re-launched with fewer restrictions on use.
- (4) By 2016: All UHW and Grand Challenge units adopt opt-out open access policies within the first year of operation.
- (5) By 2017: A human machine interface (HMI) will be integrated with UCI to create a Virtual Research Collaboration Network.
- (6) By 2017: Annual increase in number of open access articles published by IUPUI faculty equals or exceeds international norms.
- (7) By 2017: Majority of faculty have received information about compliance with the forthcoming federal public access policies and IUPUI compliance rate with NIH Public Access Policy exceeds 90% for all funded articles published in 2016.
- (8) By 2018: More than 25% of all annually published, IUPUI faculty articles will be archived in IUPUIScholarWorks within one year of publication.

Primary Responsibility: Office of the Vice Chancellor for Research (OVCR), University Library

Goal 5.3: Support new research metrics to assess research impact at all levels

Timeline and Benchmarks for Success

- (1) By 2016: All UHW, Grand Challenge and Signature Center researchers adopt ORCID within the first year of operation.
- (2) By 2016: A majority of IUPUI faculty have registered on ORCID.

- (3) By 2016: IUPUI's open access repositories meet the technical specifications to support alternative metrics tools.
- (4) By 2018: Increased use of new research metrics observed in successful IUPUI promotion and tenure dossiers.

Primary Responsibility: University Library

Goal 5.4: Facilitate data management, reuse and archiving

Timeline and Benchmarks for Success

Benchmarks for Success

- (1) By 2016: A data management plan and sharing plan has been developed and is being implemented by all faculty and staff involved with the Grand Challenge and Signature Centers Initiatives.
- (2) By 2016: IUPUI faculty research data related to UHW are made available by deposit into subject (e.g., ICPSR, Data Dryad) and institutional repositories (e.g., IUPUI DataWorks).
- (3) By 2017: Implementation of data management plans and reuse of shared data are tracked and reported to participating research units.

Primary Responsibility: University Library

Costs for Goals 5.1-5.4:

Costs (Annual) for OVCR

FTE Communication and Marketing Professional (100% FTE)	\$70,000
Marketing resources and tools (ads placement, production, etc.)	\$30,000
HMI platform development and testing	\$20,000

TOTAL ANNUAL COSTS **\$120,000**

Costs (Annual) for University Library

1, 75% of FTE Digital Scholarship Data Services Librarian	\$50,400*
1, 75% of FTE Scholarly Communications Librarian	\$50,400*
1, 100% FTE Digital Scholarship Programmer	\$91,000
1, 25-30 hr, Data Services Graduate Assistant	\$18,000
1, FTE Staff Scholarly Communications Assistant	\$58,800
1, 50% of FTE Repository Data Entry Assistant	\$21,700*
IUPUI Open Access Fund	\$50,000
IUPUI Open Access Journal Start Up Grants	\$5,000
ORCID membership	\$25,000

TOTAL ANNUAL COSTS: **\$370,300**

* In Kind contributions (work already being done by University Library employees) totals \$122,500.