WEDNESDAY, NOVEMBER 20, 2019
ACADEMIC AFFAIRS, STUDENT LIFE & RESEARCH COMMITTEE MEETING

Alex Shumate
Brent R. Porteus
Abigail S. Wexner
Cheryl Krueger
Hiroyuki Fujita
Alan A. Stockmeister
Elizabeth P. Kessler
Jeff M.S. Kaplan
Anand Shah
Alan VanderMolen
Janet Porter
Susan Olesik
Gary R. Heminger (*ex officio*)

Location: Longaberger Alumni House   Time: 3:45-5:45pm
Sanders Grand Lounge

Public Session

ITEMS FOR DISCUSSION

1. *Provost's Report – Dr. Bruce McPheron*   3:45-3:55pm

2. *Strategic Plan for Research and Creative Expression – Dr. Morley Stone*   3:55-4:10pm

3. *Academic Affairs, Student Life & Research Scorecard – Dr. Bruce McPheron,*   4:10-4:20pm
   Molly Ranz Calhoun, Dr. Morley Stone

4. *Online and Hybrid Education at Ohio State and a Nursing Case Study –*   4:20-4:35pm
   Dr. Bruce McPheron, Mike Hofherr

5. *Building Healthy Communities Through a Holistic Approach to Wellness –*   4:35-4:50pm
   Molly Ranz Calhoun

ITEMS FOR ACTION

6. Approval of a New Degree Program: Master's in Translational Data Analytics –   4:50-5:05pm
   Dr. Bruce McPheron

7. Amendments to the *Rules of the University Faculty* – Dr. McPheron

8. Faculty Personnel Actions – Dr. Bruce McPheron

9. Degrees and Certificates – Dr. Bruce McPheron

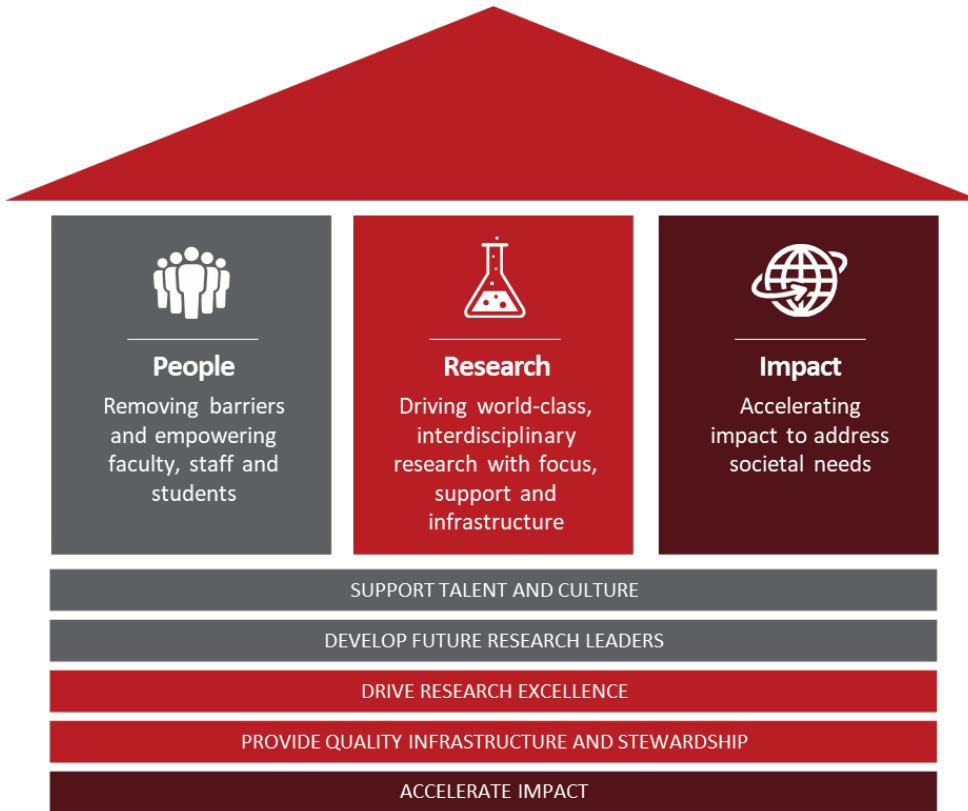**Executive Session**   5:05-5:45pm

Research and Creative Expression Strategic Plan

Implementation Plan

OSU Research and Creative Expression Aspiration

Ohio State will be the leading land-grant university in research and creative expression excellence, creating new knowledge, solving critical societal challenges, and driving the prosperity of Ohio, the nation and the world.

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Research and Creative Expression Strategic Plan

People
Removing barriers and empowering faculty, staff and students

Research
Driving world-class, interdisciplinary research with focus, support and infrastructure

Impact
Accelerating impact to address societal needs

SUPPORT TALENT AND CULTURE

DEVELOP FUTURE RESEARCH LEADERS

DRIVE RESEARCH EXCELLENCE

PROVIDE QUALITY INFRASTRUCTURE AND STEWARDSHIP

ACCELERATE IMPACT

Goals:

1. **Support talent and culture**: Build and sustain a culture of excellence that attracts, engages and supports top faculty and staff talent, enabling them to perform at the highest levels

2. **Develop future research leaders**: Attract, develop and support an inclusive and innovative community to educate future research leaders who create impact in academia, industry, and broader communities

3. **Drive research excellence**: Establish Ohio State as the leading university in interdisciplinary research and creative expression

4. **Provide quality infrastructure and stewardship**: Provide high quality, innovative physical space, infrastructure and financial support for research and creative expression

5. **Accelerate impact**: Broadly expand Ohio State's research and creative expression engagement beyond the campus to accelerate impact

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Evidence of Success

➢ **Foster greater interdisciplinary research leading to more convergence**

➢ **Greater faculty engagement – increase in student research experiences**

➢ **Impact – redefine metrics for success**

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Goal 1 - Support Talent and Culture

Build and sustain a culture of excellence that attracts, engages and supports top faculty and staff talent, enabling them to perform at the highest levels

Initiatives and Tactics

1. Establish a culture of shared leadership that relies heavily on faculty expertise and inclusion to execute Ohio State's research and creative expression strategy, set priorities, and allocate resources
   a) Create a faculty advisory group composed of the most research active faculty, department chairs, and distinguished professors to be empowered in participatory decision making
   b) Create venues for soliciting broad faculty input in research strategy and execution

2. Promote and demonstrate a university-wide culture of faculty and staff excellence and continuous improvement including: diversity and inclusion, interdisciplinary collaboration, ethics and integrity, quality of scholarship, and the societal and community impact of research and creative expression at Ohio State
   a) Recruit faculty in priority research areas and evaluate return on investment and effectiveness of recruitment approaches, e.g. cluster hiring, utilization of external agencies for recruitment
   b) Proactively support retention of high performing, high potential and collaborative faculty at all levels, before retention becomes an issue
   c) Provide support for interdisciplinary hiring, centers that engage in interdisciplinary research (both within and between colleges), and incentives for interdisciplinary research and creative expression collaboration
   d) Ensure competitive salaries to support recruitment and retention of top faculty with the goal to move into the top quarter of the Big Ten by 2025
   e) Invest in high performing faculty and staff through promotion, recognition and rewarding accomplishments, administrative support, infrastructure enhancement and maintenance and seed funding
   f) Provide resources to recruit scholars in strategic growth areas (e.g., Presidential Professorship Program, ENGIE chairs, Presidential Postdoctoral Scholars Program)
   g) Identify and nominate faculty for top tier recognitions e.g., National Academy membership
   h) Incentivize efforts to increase diversity and inclusion in research and creative expression and ensure that women and underrepresented groups are provided support at each part of the career cycle
   i) Identify and address research challenges and needs of early-career faculty
   j) Align with the Office of Student Life and Wellness initiatives to provide faculty and staff holistic support, including career counseling, family support (e.g., childcare), personal and interpersonal wellness, including mental health support

Sequencing (years) — 1 2 3 4 5
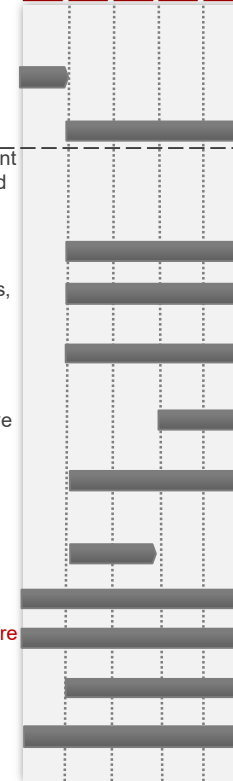
Implementation Leads

- A-B: OR
- A-C: OR, OAA, Deans
- D: Deans and OAA
- E-G: Deans, OAA, OR
- H: OR, ODI
- I: OR
- J: Student Life, ODI

Required Resources

- College budget allocations
- Potential startup fund

Red = Academic Year 2020 priority

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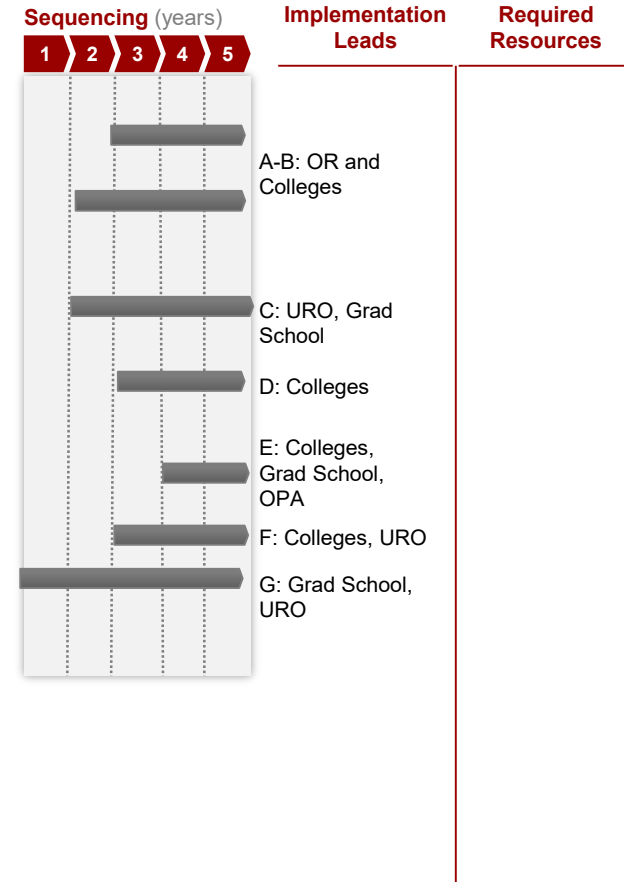# Goal 1 - Support Talent and Culture, continued

Build and sustain a culture of excellence that attracts, engages and supports top faculty and staff talent, enabling them to perform at the highest levels

Initiatives and Tactics

3. Expand recruitment of and training for faculty and staff to be successful research leaders, including faculty and staff from underrepresented groups.

   a) Better coordinate existing faculty development resources and programs between OAA and the Office of Research and identify gaps where new programs should be developed

   b) Provide effective onboarding for new faculty with a special focus on how to be successful in conducting interdisciplinary research

   c) Develop program for research integrity and ethics training to be included in onboarding process for new faculty and offered as continuing education for existing faculty

   d) Create a research leadership training program open to faculty at all stages interested in developing their research leadership skills

   e) Establish a peer mentoring program for faculty to prepare them for center-level leadership

   f) Increase representation of women and underrepresented minorities in research leadership and administration positions across the university

   g) Reward faculty for excellence in research mentoring

Sequencing (years)

| 1 | 2 | 3 | 4 | 5 |

Implementation Leads

A-B: OR, OAA

C-D: OR

E: OR, Colleges

F-G: OAA, OR, ODI, Colleges

Required Resources

Online module or staff to conduct training

Red = Academic Year 2020 priority

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Goal 2 - Develop Future Research Leaders

Attract, develop and support an inclusive and innovative community to educate future research leaders who create impact in academia, industry, and broader communities

Initiatives and Tactics

1. Increase and broaden undergraduate and graduate student participation in research and creative expression across the University

   a) Provide more institutional support and faculty incentives to increase the number of post-doctoral trainees and PhD students supported by external research funds

   b) Coordinate efforts to engage undergraduate students in research and creative expression by leveraging and increasing visibility of existing programs and offices such as the Office of Undergraduate Research and Creative Inquiry and emphasizing research opportunities in First Year Experience and STEP programs.

   c) Better promote forums for facilitating and showcasing student research excellence by building on the success of current events, such as the Denman Undergraduate and Hayes Graduate Research Forums

   d) Increase visibility of students and postdoctoral trainees receiving university fellowships or other support, including forums for students to present research, form cohorts, attend research meetings, joining professional organizations

   e) Encourage systemic adoption of individualized development plans (IDP) to provide a career and personal development roadmap for graduate students, post-doctoral trainees and early career faculty

   f) Reward faculty for engaging undergraduate students in research and creative expression

   g) Create a training program for graduate students and postdoctoral trainees to train undergraduate students in research

Sequencing (years) — 1 2 3 4 5

Implementation Leads

Required Resources

A-B: OR and Colleges

C: URO, Grad School

D: Colleges

E: Colleges, Grad School, OPA

F: Colleges, URO

G: Grad School, URO

Red = Academic Year 2020 priority
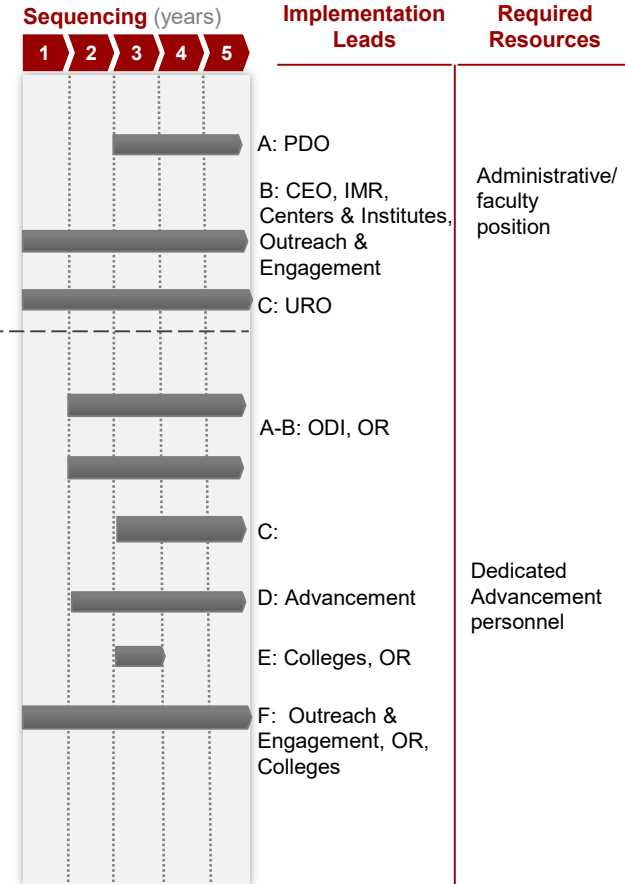
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Goal 2 - Develop Future Research Leaders, continued

Attract, develop and support an inclusive and innovative community to educate future research leaders who create impact in academia, industry, and broader communities

Initiatives and Tactics

Sequencing (years): 1 2 3 4 5

Implementation Leads

Required Resources

2. Establish Ohio State as a leader in research translation and innovation training, through interdisciplinary, industry and community-engaged research and creative expression opportunities

   a) Build the infrastructure designed to increase success with competitive large training grants in priority scientific research areas, including create an administrative/faculty position for helping with the submission and managing training and multidisciplinary center grants across the University — A: PDO

   b) Broaden opportunities and funding for student, faculty, and post-doctoral researchers to engage in collaborative research and innovation with industry and community partners. — B: CEO, IMR, Centers & Institutes, Outreach & Engagement

   c) Increase undergraduate student research participation in on-campus experiential programs that provide translation and innovation experiences — C: URO

3. Drive partnerships and experiences for students who bring diverse ideas, perspectives, backgrounds to research and creative expression, aligned with Pillar 2 strategy

   a) Create cohort experiences for students from underrepresented groups with an emphasis on research methods and tactics

   b) Develop sustained partnerships with minority serving institutions and international institutions to broaden access and inclusiveness of undergraduate research opportunities — A-B: ODI, OR

   c) Recruit grad students, post-doctoral trainees and faculty from current campus community, potentially through pipeline program (e.g. EDE-EDGE program, University of California Presidential Post-doctoral trainees) — C:

   d) Increase fundraising efforts to recruit more diverse graduate students and post-doctoral trainees to the university — D: Advancement

   e) Provide incentives and support for faculty to apply for diversity supplements on an existing grant, e.g., staff person within colleges to support applications — E: Colleges, OR

   f) Increase university-community partnerships in which student research and creative expression can be used to address community partners' needs — F: Outreach & Engagement, OR, Colleges

Required Resources: Administrative/ faculty position; Dedicated Advancement personnel

Red = Academic Year 2020 priority

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Goal 2 - Develop Future Research Leaders, continued

Attract, develop and support an inclusive and innovative community to educate future research leaders who create impact in academia, industry, and broader communities

Initiatives and Tactics

4. Support and strengthen diverse research career pathways, including in academia, industry, entrepreneurship, government, and community and non-profit organizations, to ensure Ohio State graduates are placed in settings where they can make significant impacts
   a) Strengthen non-academic career pathways and support for students and faculty advisors; hold summits that include BTAA or Ohio Universities (including Columbus State, for example) participants to share best practices and develop cohorts
   b) Create exposure to research careers by connecting undergraduate and graduate student to alumni in research-oriented positions in industry, government, community organizations, and startups through co-ops, internships, campus visits, and deans' advisory boards
   c) Engage entrepreneurs as mentors to increase opportunities for innovation and entrepreneurial experiences for students and faculty

Sequencing (years)

| 1 | 2 | 3 | 4 | 5 |

Implementation Leads

A: Student Acad. Success, Grad School

B: Alumni Association, Student Life (Career Services)

C: CEO

Required Resources

Red = Academic Year 2020 priority

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Goal 3 - Drive Research Excellence

Establish Ohio State as the leading university in interdisciplinary research and creative expression

Initiatives and Tactics

1. Provide thought leadership locally, nationally and internationally
   a) Set the national research agenda and enable proactive identification of Federal research opportunities aligned with prioritized areas through a presence in Washington and working with agency leaders, to diversify and increase Federal support
   b) Seek opportunities to participate and drive the global dialogue on issues that align with research priorities including climate, sustainability, water, immigration, societal disparities and human rights, where Ohio State can deliver significant impact
   c) Be a national and international leader in broadening the methods, assessments and metrics used to measure, report and demonstrate research impact and success and impacts that contribute to the public good

2. Invest in emerging, high impact interdisciplinary research and creative expression opportunities within the broader areas of Health and Wellbeing, Food Systems, Business and Economy, Mobility and Access, Governance and Security, Human Development, and Energy and Environment
   a) Enhance and support university strategic research priorities, such as: cybersecurity for society, addiction, and mobility
   b) Establish a seedling program to stimulate new multidisciplinary collaborations in novel research and creative expression areas
   c) Use prioritization criteria to evaluate and prioritize newly emerging research areas
   d) Regularly review all major interdisciplinary research centers

3. Identify and remove barriers to interdisciplinary research excellence
   a) Further adjust promotion and tenure criteria to acknowledge and reward entrepreneurship, creativity, interdisciplinarity, socially significant activities, and other diverse, impactful forms of research and creative expression
   b) Facilitate more interdisciplinary networking events for researchers to share information and best practices to collaboration
   c) Provide faculty who are leading large, complex and interdisciplinary research and creative expression endeavors with protected time such as teaching releases, off duty, and administrative support
   d) Proactively bring multi-disciplinary teams together to address emerging issues and opportunities

Red = Academic Year 2020 priority

Sequencing (years): 1 2 3 4 5
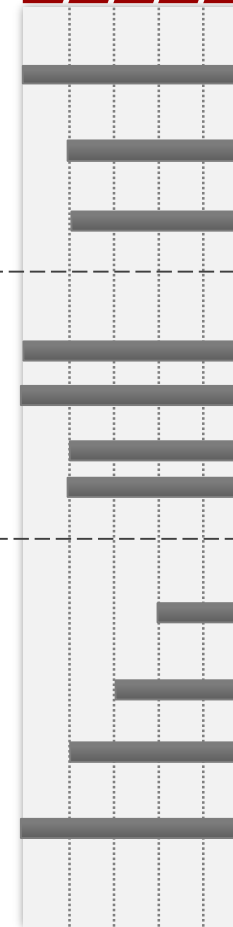
Implementation Leads
- A-C: OR/PDO, work with Govt Affairs
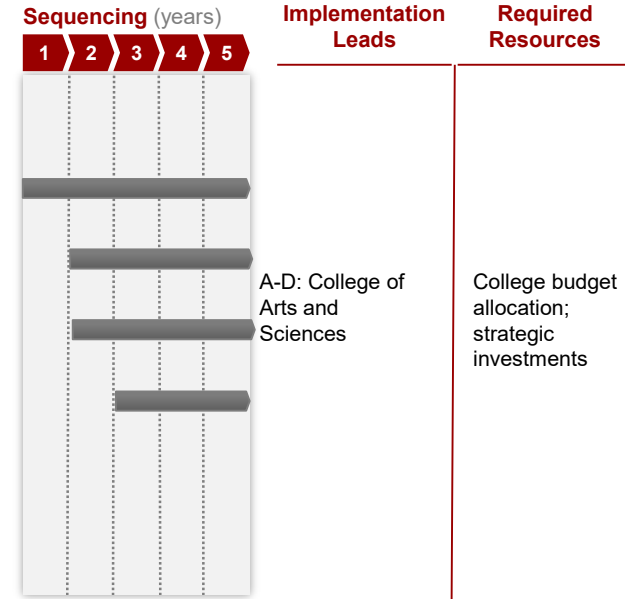- A-D: OR/OAA
- A-C: OR/OAA
- D: PDO

Required Resources
- Travel grant program, OSU2DC
- Seeling funds, strategic investments
- College budget allocation, strategic investments

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Goal 3 - Drive Research Excellence, continued

Establish Ohio State as the leading university in interdisciplinary research and creative expression

Initiatives and Tactics

| Implementation Leads | Required Resources |

4. Establish Ohio State as a leading public university in amplifying the arts and humanities within and across its research and creative expression endeavors

   a) Ensure there is a stable and reliable funding structure for faculty to support research and creative expression in the arts and humanities

   b) Promote and nurture interdisciplinary arts and humanities research and support, emphasize, and make visible the contributions of that research to the public conversation and needs

   c) Create arts-based research exchanges including leveraging the opening of the University Arts District in 2021

   d) Advance Ohio State's leadership in Digital Arts and Humanities by connecting existing resources and centers into a broad-based university network model

   e) Enhance awareness of and support for interdisciplinary work in arts and humanities by highlighting integrated research centers

A-D: College of Arts and Sciences

College budget allocation; strategic investments

Red = Academic Year 2020 priority

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Goal 4 – High Quality Infrastructure and Stewardship

Provide high quality, innovative physical space, infrastructure and financial support for research and creative expression

Initiatives and Tactics

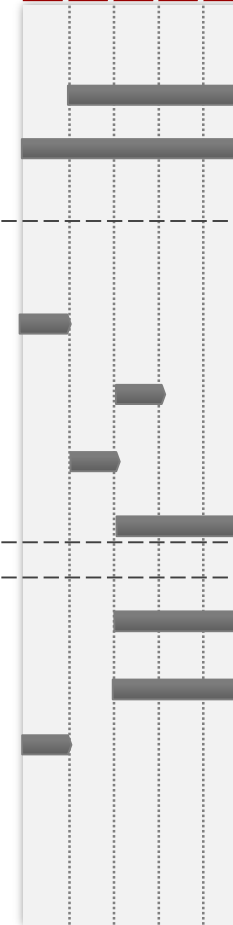**Sequencing** (years) 1 2 3 4 5

Implementation Leads

Required Resources

1. Provide modern and sustainable physical facilities that enhance collaborative, interdisciplinary research and creative expression
   a) Continually increase the fraction of research and creative expression space which is graded as "good" or better by renovating and replacing existing facilities
   b) Ensure that research and creative expression space priorities are included in the university's capital plan and that they are prioritized in a manner that advances the research strategy

   A-B: OR, Admin & Planning, Deans

   Capital investments for space needed beyond currently planned projects

2. Enhance integration of core facilities and research support infrastructure, and improve their access and availability
   a) Establish Ohio State'spreston2SORRENTO
   b) Cores and Facilities Committee reporting to the Senior VP of Research charged with monitoring the quality and effectiveness of cores and facilities, identifying needs and barriers, and recommending solutions and new initiatives
   c) Develop and maintain a university-wide, easily accessible relational database of cores, laboratories, facilities, services and equipment
   d) Develop definitions of success measures, values and accountability for core facilities that should be centrally supported, with units, departments and colleges contributing to central pool
   e) Ensure researchers' needs are addressed in campus smart mobility initiatives

   A-D: OR

   OR/OCIO

   Software tools and licenses

3. Provide non-physical infrastructure support to enable collaboration and interdisciplinary research
4. Provide world-class research support personnel
   a) Create a culture, in central administrative units, that supports the time-sensitive and innovative nature of research and that reduces administrative burden
   b) Ensure that researchers have access to appropriate data analysis, storage, and transfer resources and remote instrument operation capabilities
   c) Provide an enhanced suite of tools for reporting and leverage those tools to reduce administrative burdens and delays

   A-C: OR/OCIO

Red = Academic Year 2020 priority

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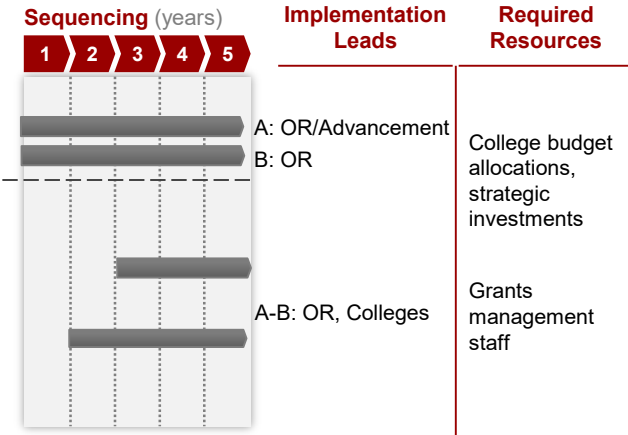
Goal 4 – High Quality Infrastructure and Stewardship, cont.

Provide high quality, innovative physical space, infrastructure and financial support for research and creative expression

Initiatives and Tactics

Sequencing (years)

| 1 | 2 | 3 | 4 | 5 |

Implementation Leads

Required Resources

5. Identify, pursue and secure new funding sources for research and creative expression
    a) Collaborate with Advancement to implement a comprehensive philanthropy strategy
    b) Increase institutional support for research and creative expression

A: OR/Advancement
B: OR

College budget allocations, strategic investments

6. Improve coordination of existing proposal development resources and programming across the institution and align with diversified funding sources
    a) Identify and nurture leaders with the potential skills and knowledge to lead larger, more complex research teams and efforts.
    b) Increase the number of grants management staff to provide wrap-around services during the proposal development process reducing the administrative burden on principal investigator

A-B: OR, Colleges

Grants management staff

Red = Academic Year 2020 priority
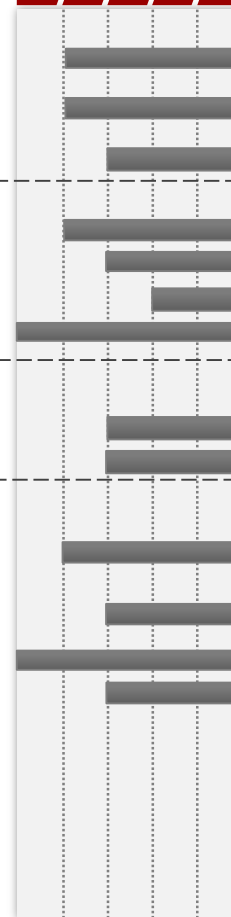
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Goal 5 – Accelerate Impact

Broadly expand Ohio State's research and creative expression engagement beyond the campus to accelerate impact

Initiatives and Tactics

Sequencing (years): 1 2 3 4 5

Implementation Leads

Required Resources

1. Transform our interactions with industry partners to interdependent relationships
   a) Create and implement new types of partnering models to streamline engagement with industry partners (e.g., Technical Access Fee)
   b) Prioritize and manage key strategic industrial partners relative to value outcomes and potential
   c) Leverage advanced business analytics to better understand needs of industry partners

   A-C: OR, CEO

2. Grow research portfolio to solve global problems
   a) Increase convergence research with a global focus
   b) Expand and drive new types of global partnership models
   c) Develop thought leadership to drive global policy

   A-C: OR, OIA

   d) Understand foundation partner research needs and dedicate foundation relationship managers to work with faculty in developing new opportunities

   D: OR, Advancement

   Work with Foundation Relations (Leanda Rix)

3. Expand and create new pathways to engage community partners – in designing, interpreting, disseminating research and scholarship
   a) Expand use of Columbus as a test bed for research solutions
   b) Increase citizens' engagement in research and contributions to the research agenda

   A-B: OR, Outreach and Engagement

4. Drive economic engagement and development in the region through translation of knowledge, discovery and creative expression
   a) Successfully launch new start-ups and spinouts to transfer new technologies developed at Ohio State by exploring venture capital/angel funding models
   b) Incentivize commercialization through engagement and targeted communications with faculty, potential licensors and investors

   A-D: OR, CEO, TCO

   c) Expand commercialization training opportunities for faculty, staff and students
   d) Maximize west campus innovation district opportunities for economic development

Red = Academic Year 2020 priority

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Goal 5 – Accelerate Impact, continued

Broadly expand Ohio State's research and creative expression engagement beyond the campus to accelerate impact

Initiatives and Tactics

5. Shape future workforce to meet industry and societal needs through multi-disciplinary research experiences
   a) Engage strategic industry leaders to help Ohio State to be proactive in addressing future workforce needs
   b) Provide experiences for our students and trainees that prepare them for leadership in an innovation-driven society

6. Enhance ways to communicate and disseminate Ohio State's research and creative expression impact and broaden awareness of its many avenues for engagement
   a) Assist researchers in disseminating results and demonstrating impact to non-academic audiences, including practitioners, policymakers and the general public
   b) Develop and implement a strategic marketing and communications plan for research and creative expression at Ohio State that focuses on priority areas and community engagement and impact
   c) Establish Ohio State as an indispensable resource, convener and advisor, by creating experts' bureaus in areas of the state of Ohio's challenges, including water, child development, addiction and innovation

Sequencing (years)
1 2 3 4 5

Implementation Leads

A-B: OR, CEO

A-C: OR, Marketing and Communications, Govt Affairs

Required Resources

Red = Academic Year 2020 priority

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	Measurement		2017-18	2018-19	2019-20 Actual	Status	2019-20 Target
Teaching and Learning	Percentage of faculty who have completed Teaching Practices Inventory		Launched in 2019	75.2%	76.1%*	▲	70% (Mandatory for all new UG teaching faculty by 2021)
	Percentage of faculty who have completed Teaching@OhioState modules/UITL Reading List		Launched in 2019	47.2%	49.9%*	▲	50% (Mandatory for all new UG teaching faculty by 2021)
	Student participation in high impact learning opportunities		In Progress	In Progress	In Progress		In Progress
	WSJ / THE Student Engagement Survey Public University Rank		16th	20th	7th	▲	Maintain Top 10
Access and Affordability	Percent of NFYS Pell recipients	Columbus	16.9%	16.4%	18.2%	▲	N/A
		Regional	38.5%	36.5%	34.8%	▼	N/A
	Percentage of Pell recipients with 100% tuition and mandatory fees met (Ohio residents)	Columbus	78.0%	96.0%	Available Mid-Oct 2020	▲	95.0%
		Regional	50.0%	60.0%	Available Mid-Oct 2020	▲	N/A
	Total institutional aid awarded to students (Columbus)	Non-Need-based	$74.7M	$77.6M	$78.5M	▲	N/A
		Need-based	$114.0M	$121.0M	$127.8M	▲	N/A
	Percentage of UG students graduating with no debt		48%	50%	Available Mid-Oct 2020	▲	48%
	Average student debt for UG graduating cohorts who borrowed		$27,453	$27,242	Available Mid-Oct 2020	▼	N/A
	No. of Columbus campus students who changed from Ohio State regional campuses or transferred from Ohio community and technical colleges		2,337	2,327	2,370	▲	2,370
Student Experience and Success	First year retention rates	Columbus	94.2%	94.5%	94.1%	▼	94.6%
		Regional	67.7%	70.5%	68.7%	▼	71.0%
	Four/Six-year graduation rates (Columbus, Freshman Cohort)	Four-year	62.4%	64.6%	67.0%	▲	65.0%
		Six-year	82.5%	83.5%	85.8%	▲	85.0%
	Graduation rates for transfer students (to Columbus campus)	Four-year	68.0%	69.0%	68.7%	▼	N/A
		Six-year	72.1%	72.7%	74.4%	▲	N/A
	Six-year graduation rates by Pell status (Columbus)	Pell Recipients	74.4%	75.7%	78.3%	▲	N/A
		Non-Pell Recipients	84.7%	85.3%	87.5%	▲	N/A
	Degree completions (All Campuses)	Bachelors	11,349	11,478	Data for 2019-20 available mid-July 2020	▲	N/A
		Masters	2,761	2,750		▲	
		Doctoral	855	886		▲	
		Professionals	807	802		◄►	
		Total	15,772	15,916		▲	
	Participation in undergraduate student activities		80.9%	80.2%	Data Available Spring 2020	◄►	83%
	Sense of belonging score - graduate/professional students (4-point scale, 4 being the most positive)		3.03	3.06		▲	3.20
	Graduating students' overall satisfaction with Ohio State experience	Columbus	91.1%	88.8%		▼	91%
		Regional	90.2%	90.3%		◄►	91%
	Graduating students who say Ohio State is a good investment	Columbus	75.2%	70.0%		▼	75%
		Regional	71.1%	76.0%		▲	75%
Research and Creative Expression Excellence and Faculty Success	Number of National Academy Members and other Prestigious Awards		289	297	304*	▲	300
	Recruit and retain talent	Chaired Faculty	N/A	N/A	198*		205
		Postdoctoral Scholars	642	595	659*	◄►	650
		Grad. Research Associates Funded on Grants	1,284 (64%)	1,295 (62%)	1,432 (63%)*	▲	1,489 (65%)
	Total R&D Expenditures/ US university rank - NSF HERD	Expenditures	$875M	Data Available November 2019	Data Available Fall 2020	▲	$950M
		Ranking	N/A				21st
	Total industry-funded R&D Expenditures/ US university rank - NSF HERD	Expenditures	$139M	Data Available November 2019	Data Available Fall 2020	▲	$165M
		Ranking	N/A				3rd
	Total number of publications, citations and other creative expression indicators	Publications	21,671	22,695	Data Available Fall 2020	▲	23,150
		Citations	376,572	424,374		▲	433,000
		Performances and Exhibitions	In Progress	In Progress	In Progress		In Progress
	Technology Commercialization	Gross License Income	$7,972,860	$8,862,863	Data Available Fall 2020	◄►	$5,000,000
		Start-ups	19	14		◄►	15
		Invention Disclosures	458	418		▼	425
Reputation and Strategic Position	USNWR, America's Best Colleges Rank (Publics)		17	17	Available Sep 2020	◄►	In Progress
	Number of Graduate & Professional Programs in Top 25		52	51	Available May 2020	◄►	In Progress
	Online Degree/certificate Programs	# of Programs	27	36	38*	▲	35
		Program Enrollment	2520	3652	2875*	▲	3,000
		Revenue Generation	$13.3M	$16.6M	$27.3M*	▲	$25M

Note: BOT Time and Change Scorecard Metrics are indicated by light blue shading in the table.
* Data with an asterisk (*) is most recent, year-to-date data.

🟩	Meets or Exceeds Goal	▲	Performance Up from last Scorecard Update
🟧	Caution	◄►	No Performance Change from last Scorecard Update
🟥	Below Goal - Action Needed	▼	Performance Down from last Scorecard Update
⬜	Data Pending for most recent year		

Building Healthy Communities through a Holistic Approach to Wellness

Wellness is an important component of building a healthy community of students and is a key part of academic success. Physical, emotional and social well-being are associated with academic achievement during college (DeBerard et al., 2004; Ruthig et al., 2011). Research from the National College Health Assessment (NCHA) indicates that emotional and physical health are important factors associated with student academic performance (ACHA, 2019). According to guidelines from the American College Health Association (ACHA), physical and social environments that promote health enable students to achieve their academic and personal goals (ACHA Guidelines, 2012).

Wellness is commonly recognized as a holistic, multidimensional construct. A holistic approach to wellness, rather than a focus on only physical health, has been found to significantly increase individuals' overall wellness knowledge, self-efficacy and specific health-related behaviors like exercising (Gieck & Olsen, 2007). The Ohio State University takes a holistic approach to student wellness by promoting balanced lifestyles and student success through the Nine Dimensions of Wellness, developed by the Office of Student Life's Student Wellness Center in 2004.

The nine dimensions include:

- Career
- Creative
- Emotional
- Environmental
- Financial
- Intellectual
- Physical
- Social
- Spiritual

The Office of Student Life offers programming, support and resources for all nine dimensions of wellness. An example of these services is the Scarlet and Gray Financial Coaching Program, offered by the Student Wellness Center.

The program is comprised of two components:

1) Online modules that guide students through fundamental financial concepts.

2) One-on-one appointments with trained peer coaches who help students clarify concepts from the online modules, develop an awareness of their own financial standing, establish financial goals and create a financial plan to achieve goals.

Scarlet and Gray Financial was established in 2006 and was developed based on more than a decade of research conducted by the Office of Student Life and College of Education and Human Ecology aimed at understanding the financial knowledge, behaviors and experiences of college students (Shaulskiy, Duckett, Kennedy-Phillips & McDaniel, 2015; Baker, Andrews & McDaniel, 2017; Montalto, Phillips, McDaniel & Baker, 2019). The program was also developed using a peer coaching model, which research finds is a promising practice that impacts students' development and outcomes (Shook & Keup, 2012).

A research study of the effectiveness of Scarlet and Gray Financial found that students who participated in the program reported a statistically significant increase in their overall financial wellness, confidence in budgeting, ability to set personal financial goals and gains in their familiarity with key financial concepts like APR, credit limits and transaction fees. Scarlet and Gray Financial has been recognized nationally as a best practice, including being featured in the US Department of Treasury's report on *Best Practices for Financial Literacy and Education in Institutions of Higher Education* and winning the 2018 Gold Award for Student Health, Wellness and Counseling programs from NASPA – Student Affairs Administrators in Higher Education.

THE OHIO STATE UNIVERSITY

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Financial Wellness By The Numbers

62% of Ohio State students report feeling stressed about their finances in general (Study on Collegiate Financial Wellness, 2017).

86% of Ohio State students are confident that they can manage their finances (Study on Collegiate Financial Wellness, 2017).

98% of students who attended a one-on-one coaching appointment agreed that they understand the importance of a budget as a result of their session.

60 students serve as Scarlet and Gray peer financial coaches each year.

9,447 Scarlet and Gray Financial coaching appointments were completed in the last five years (2014-15 through 2018-19 academic year).

$44,400 was saved by 222 students in the 2018-19 academic year through a partnership with Scarlet and Gray Financial and the University Bursar fee waiver program.

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**ESTABLISHMENT OF A PROFESSIONAL SCIENCE MASTERS DEGREE PROGRAM
IN TRANSLATIONAL DATA ANALYTICS**

TRANSLATIONAL DATA ANALYTICS INSTITUTE (TDAI)

Synopsis: Approval to establish the Professional Science Master's Degree Program in Translational Data Analytics in the Translational Data Analytics Institute (TDAI); the Department of Computer Science in the College of Engineering; and the Department of Design, Department of Statistics and the Advanced Computing Center for the Arts And Design (ACCAD) in the College of Arts and Sciences, is proposed.

WHEREAS this is a post-baccalaureate professional degree aimed at employees of local and regional businesses; and

WHEREAS the program addresses the increasing demand for deep analytical skills within business and redresses a skills gap identified by industry at the local and global level; and

WHEREAS the curriculum provides knowledge of fundamental principles of computer science; fundamental principles of data analysis, statistical inference and machine learning; translational competency, enabling the transfer, application and validation of analytical methods as well as understanding of data governance obligations and ethics; and mastery of professional skills, such as storytelling and translating technical solutions to audiences with varied backgrounds; and

WHEREAS the proposal was reviewed and approved by the Council on Academic Affairs at its meeting on June 13, 2019; and

WHEREAS the proposal was reviewed and received a vote of approval by the University Senate on September 19, 2019:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves the establishment of the Professional Science Master's Degree Program in Translational Data Analytics in the Translational Data Analytics Institute.

To: University Senate

From: Jennifer Higginbotham, Co-Chair, Council on Academic Affairs

Subject: Proposal to Establish the Professional Science Masters Degree Program in Translational Data Analytics

Date: September 19, 2019

A PROPOSAL FROM THE COUNCIL ON ACADEMIC AFFAIRS TO ESTABLISH THE PROFESSIONAL SCEINCE MASTERS (PSM) IN TRANSLATIONAL DATA ANALYTICS, TRANSLATIONAL DATA ANALYTICS INSTITUTE (TDAI); DEPARTMENT OF COMPUTER SCIENCE IN THE COLLEGE OF ENGINEERING, DEPARTMENT OF DESIGN, DEPARTMENT OF STATISTICS, AND THE ADVANCED COMPUTING CENTER FOR THE ARTS AND DESIGN (ACCAD) IN THE COLLEGE OF ARTS AND SCIENCES

Whereas	this is a post-baccalaureate professional degree aimed at employees of local and regional businesses, with a title that conveys essential and applied skills in modern data analysis and computer science, with a target audience of mid-career professionals working in Data Science Analytics
Whereas	the program addresses the increasing demand for deep analytical skills within business and redresses a skills gap identified by industry at the local and global level
Whereas	the professional masters will begin with a track in Design and Visualization, adding additional tracks as the program grows in accordance with market need and contingent upon success of the pilot will consider the addition of tracks involving other academic units such as decision science and geographical information systems
Whereas	the curriculum provides knowledge of fundamental principles of computer science; fundamental principles of data analysis, statistical inference, and machine learning; translational competency, enabling the transfer, application, and validaton of analytical methods as well as understanding of data

governance obligations and ethics; and mastery of professional skills such as storytelling and translating technical solutions to audiences with varied backgrounds

Whereas   it is a 33 semester credit hour program (foundational courses, core courses in data design and visualization, a two-semester capstone sequence emphasizing experiential learning, and three multi-disciplinary seminars on data management, research methods, and professional development)

Whereas   the curriculum was designed by a dozen faculty representatives from the participating academic units, and the TDAI held two roundtables in 2017 and 2018 with stakeholders from industry, government agencies, and non-profits who offered feedback and expressed an urgent need for workers who know how to tell data stories. TDAI subsequently held a townhall in January 2019 to which all faculty affiliates were invited with over 100 in attendance, and they have distributed information about the PSM in the Institute's monthly newsletter.

Whereas   following review by the combined Graduate School/Council on Academic Affairs subcommittee, the proposal was reviewed and approved by the Council on Academic Affairs at its meeting on June 13, 2019

Therefore be it resolved that the University Senate approve the proposal to establish the Professional Science Masters in Translational Data Analytics and respectfully request approval by the Board of Trustees.

THE OHIO STATE UNIVERSITY
TRANSLATIONAL DATA ANALYTICS INSTITUTE

A Proposal for a
Professional Science Master's Degree Program in
Translational Data Analytics

Note: This document contains the executive summary of this proposal. The complete set of materials reviewed by the Senate are found in the Senate archives at go.osu.edu/masters-tda

Prepared by:

The Translational Data Analytics Institute

The Ohio State University

April 10. 2019

I. EXECUTIVE SUMMARY

The groundwork for the Professional Science Master's (PSM) degree in Translational Data Analytics (TDA) was laid four years ago when the Translational Data Analytics Institute (TDAI) conducted an academic scan and gap analysis of graduate and professional offerings related to data science and analytics at The Ohio State University. In addition to these internal efforts, local and regional partners of the Institute have articulated high demand for additional data science programming. At two roundtable events in July 2017 and August 2018, potential employers from industry, government agencies and non-profit organizations provided valuable feedback on a draft curriculum and identified directions for further development. Roundtable participants expressed a clear demand for data scientists and analysts who are not only skilled with statistical methods and computing best practices, but also with the ability to "tell data stories". As a result, the first track of the proposed PSM degree embeds data science and analytics with design. This unique combination of data science with storytelling and visualization will differentiate Ohio State's offering from our competitors.

The proposed degree is built on partnerships between TDAI and the Colleges of Engineering and Arts and Sciences, as well as the Advanced Computing Center for Arts and Design (ACCAD). The departments of Computer Science and Engineering, Design, and Statistics will offer courses in the first specialization track planned, that of design and visualization. Contingent upon the success of this pilot, additional specializations tracks involving other Colleges will be considered in out years.

II. INTRODUCTION

The growth of data analytics creates a real imperative for The Ohio State University to lead in this field. *The proposal of the PSM program in Translational Data Analytics (PSM-TDA) represents an opportunity for The Ohio State University to produce leaders able to meet the challenges of the on-going seismic changes in the global economy.* The university has already taken a key step with the creation of the first interdisciplinary undergraduate major in data analytics at a major research institution (2014). Other premier institutions followed our example, responding to the unique and emerging needs of both academia and industry.

Despite the scale of the existing but disparate academic resources in data analytics, the university needs a clear plan for comprehensive offerings, based on local and national research and workforce needs, going beyond existing academic programming. This is urgent, as many other institutes have started degree offerings to meet the rapidly growing demand in the data analytics arena. Many of these institutes are seeing a burgeoning demand for viable degree programs from industry in their respective regions. The pressing need for an effort in this direction is underscored by the fact that one of the strongest recommendations issued at the First Data Science Leadership Summit held at Columbia University in March 2018 was to require universities to establish minimal requirements for a professional master's degree in data science. Further, Columbus 2020[1] reports that the Columbus region boasts 30 big data employers working across the analytics chain – from data capture and storage to deep analysis. This, coupled with more than 50 data centers in Central Ohio, means the region's increasing demand for deep

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[1] Columbus 2020 report. "Big Data Spotlight." 2016.

analytical skills within business is vastly underserved. We have heard from several forums and institutional collaborators, including the Columbus Collaboratory, the region's demand is in part driven by large scale projects such as SmartColumbus and the presence of financial tech industry.

III. COMPETITIVE LANDSCAPE

Nationally, many of our peers are responding to similar regional, as well as global, demands.   Every school in the Big Ten and at least seven universities in Ohio offer a degree or certificate program in data analytics at the undergraduate or graduate levels. Data analytics course offerings are also expanding at the graduate and professional levels. Programs began emerging as early as 2007 when North Carolina State University developed a graduate-level data analytics programs. The market continues to expand as universities realize the critical importance of data analytics to the wider economy. (See Appendix 1 for detailed analysis of market demand).

In 2017 the Institute commissioned two competitive landscape assessments: one from EduVentures and the other from the University's Business Intelligence Mapping Unit in the Industry Liaison Office. Highlights of both reports are summarized below in the *Overview of Competitors* section. Both reports have been included in Appendix 1 and Appendix 2, respectively. We have also included a 2017 report named *Investing in America's Data Science and Analytics Talent: The Case for Action* written jointly by PricewaterhouseCoopers (PWC) and the Business-Higher Education Forum (BHEF) in Appendix 3. Highlights are captured below in the *Novel Key Competitor Programs* section.

A. Overview of Competitors

EduVentures completed an assessment of data analytics master's programs in the US, and a detailed report can be found in Appendix 1. An assessment of academic programs in data science and analytics (DSA) was also conducted by the Business Intelligence & Mapping Unit (see Appendix 2), and for this analysis all areas of business analytics were intentionally excluded. This analysis identified 101 related graduate degrees offered by universities in the US. In 2014, Bowling Green State University was the first school in Ohio to offer a master's degree in analytics; Wittenberg University followed in 2016. While numerous employers in central Ohio have data analytics needs, there are few master's degree programs in DSA in the region. In this analysis, national academic programs were ranked based on various publication parameters; total awards by the National Science Foundation related exclusively to programs in data science; initiatives or Centers/Institutes in the DSA area; and/or offering bachelor's, master's and/or PhD programs in data analytics or statistics. Columbia University, Georgia Institute of Technology, University of California at Berkeley and Harvard University topped the rankings. With its degree offerings, funding and programs at the time of this analysis, Ohio State ranked 27th out of 30 universities.

B. Competitor Novel Programs

The 2017 report titled *Investing in America's Data Science and Analytics Talent: The Case for Action* by PwC and BHEF (see Appendix 3) discussed in detail the disconnect between academic training and industry skills required in DSA. The document specifically

highlighted four US universities – including Ohio State's - whose training programs in DSA begin to address this disconnect.

- "***The most effective programs apply data science to real-world problems.***" Here, the report uses the example of NC State's Advanced Institute for Analytics that has worked with >100 companies on multidisciplinary, eight-month student practicums.
- "***Employers want candidates with experience,***" as provided in year-long internships and co-ops through Northeastern University's Master of Data Science program.
- "***Educator-employer partnerships work best when the employer is aligned with the institutional mission and brand***." Ohio State's developing PSM-TDA program was highlighted due to our extensive partnering with private sector companies "on grants and academics…directed at using data science and analytics to reduce infant mortality in indigent urban neighborhoods, accelerate drug discovery to fight disease, and realize autonomous systems for transportation and agriculture." Regarding alignment with industry needs, the report also referenced Columbia University's Data Science Institute that was started to address local needs that would ultimately serve to "grow the local economy in New York City…Columbia structured its institute around multidisciplinary education, research, and outreach to industry."

North Carolina State University (NCSU) serves as the most suitable benchmark given our similarities in institutional makeup and prevailing enterprises in the region. The TDAI staff completed a comprehensive review of the program, the curriculum, and the job placement report of the class of 2017 (see Appendices 4, 5 and 6). Additionally, TDAI Faculty-in-Residence Dr. Dorinda Gallant (College of Education and Human Ecology, Department of Educational Studies) gained the following insights from Dr. Michael Rappa, the Director of the NCSU program, and these were considered in the design of our program.

- Focusing on academic programs will pave a path for research interactions with industry.
- Innovative and highly differentiated programs will yield dividends.
- Organizational innovation is necessary and should be attempted.
- Document success early and improvise in an agile manner.
- Interact with industry informally; listen and learn their business activities and how students we produce are benefiting them.
- Engage interested and expert faculty and empower them to be agile and innovative.
- Courses that are sum of topic threads will allow for creativity, flexibility, and adaptability.
- There is a need for a full-time person to oversee the degree program.

BHEF was also instrumental in helping TDAI and its campus partners to conceptualize and build out an experiential capstone project focused on real-world data analytics in collaboration with local community partners (see Appendix 10). This is a best practice, as evidenced by seven institutions of higher education offering data science programs with employer-engaged capstone experiences (Massachusetts Institute of Technology, North Carolina State University, Northwestern University, San Jose State University, Texas A&M University, University of Maryland, University of Washington). Representatives from these programs were interviewed to

gather insights into development and implementation of experiential learning aspects of their respective programs.

IV. PROGRESS TO DATE

Over the span of four years, a series of actions has been undertaken to investigate labor and academic student markets, provide information and gather feedback from students, faculty, university leadership, and the local industrial community. Figure 1 outlines the four phases of TDAI's deliberate and systematic approach to create a Professional Science Master's degree in translational data analytics.

During the academic year 2015-2016, TDAI conducted a comprehensive examination of data science and analytics or DSA-related academic programming at OSU (see Appendices 7, 8 and 9). Among the various recommendations to enhance data science and analytics training at OSU, the creation of a Professional Science Master's degree or the PSM in translational data analytics (TDA), or the PSM-TDA program, was accorded the highest priority. It was in fact, the former Dean of Graduate School, Prof. Scott Herness who alerted TDAI to the possibility of offering a PSM degree in data science and analytics. Subsequently, TDAI conducted quantitative, albeit general, market research through EduVentures to understand the labor market (for demand) and student market (for supply) of data analytics. In addition, TDAI organized a roundtable in July 2017 with local industry partners (see Appendix 10) and conducted a series of informational sessions with students and faculty to gather inputs for building a successful PSM.

In Spring 2018, TDAI actively developed learning objectives, a curriculum, and a tentative Advisory Board for the PSM. TDAI intends to submit the PSM proposal for consideration of approval to the Office of Academic Affairs and the Commission on Affiliation of PSM Programs during Spring 2019 and plans to welcome the first cohort of students in Fall 2020. TDAI is partnering with the departments of Computer Science and Engineering, Statistics, and Design, and with the Advanced Computing Center for the Arts and Design (ACCAD) to create the first version of the PSM program. The curriculum was designed collaboratively with all the four units. The following faculty participated: Prof. Spyros Blanas (Comp. Sci. & Eng.), Prof. Mary Ann Beecher (Design), Prof. YoonKyung Lee (Statistics), Prof. Matt Lewis (Design), Prof. Raghu Machiraju (Comp. Sci. & Eng.), Prof. Maria Palazzi (Design), Prof. Mario Peruggia (Statistics), Prof. Srini Parthasarathy (Comp. Sci. & Eng.), Prof. Rajiv Ramanth (Comp. Sci. & Eng.), Prof. Yvette Shen (Design), Prof. Han-wei Shen (Comp. Sci. & Eng.) and Prof. Joyce Zheng (Communications). The curriculum has been further refined based on feedback from the participants in the second employer roundtable held in August 2018.

The TDAI team has also met repeatedly with Vice Provost Randy Smith and relevant curriculum deans and department chairs across the campus. The topics discussed included: the proposed curriculum, the necessary oversight organization, the target audience, and the uniqueness of the proposed curriculum. The team also met frequently with Dr. Scott Herness to receive feedback and seek guidance. Appropriate approvals and guidance for the planning, design, and launch phases were obtained from a working group assembled by Vice Provost Smith and included the following faculty administrators: Prof. Christopher Hadad, Prof. Scott Herness, Prof. Stephen Fink, Prof. Waleed Muhanna and Prof. David Tomasko. Finally, presentations were made to the Council on Academic Affairs informing on the progress of the overall planning

process. Following Dr. Herness' departure, the team met with Alicia Bertone and other members of the Graduate School including Profs. Shari Speer and Jennifer Schlueter.

V. ACTIONS & ISSUES

Impact on specific groups/constituencies

Pending approval, the PSM program will be offered by the Graduate School in partnership with several academic units. The initial partnership involves three departments and one center: Computer Science and Engineering, Design, Statistics, and the Advanced Computing Center for Arts and Design. The offering rests on the contributions of our College partners in Arts and Sciences and Engineering. The Colleges and Departments involved are innovators, helping to develop an interdisciplinary program whose impact will extend beyond any single academic unit and presents significant opportunity to the University at large.

The PSM is targeting working professionals to enroll in the program on a part-time basis. The program is currently planned to be in-person. No online or hybrid instruction is currently planned. In this respect, the PSM offers needed continuing graduate education opportunities to professionals employed by local and regional businesses. The partnership between TDAI and these local businesses is a cornerstone of the proposed program and a valuable outreach to the OSU community-at-large.

Quality and academic integrity of the program will be guaranteed by the Commission on Affiliation of PSM Programs. This organization will oversee a peer-review process leading to affiliation and will periodically review the program and its achievements to ensure that the highest professional standards are maintained.

Internal programmatic changes: None anticipated.

**Impact on outside participating units**

In the initial stages of the build and launch of the PSM, the program will rely most heavily on the contributions of the two Colleges and four units identified above. Additional tracks will be considered. Some examples of these tracks could include decision sciences and geographical information systems. If implemented, their development will lead to an expansion of the PSM partnership to additional academic units.   Ultimately, the PSM will establish itself as a focal educational venture, in line with the TDAI mission of fostering active collaborative engagement between the academic, scientific, and business communities.

Relationship with Existing OSU Programs

The curricular requirements of several graduate programs (i.e. in CSE, Stats, and Fisher) at OSU contain elements of data management and analysis. Typically, they aim to provide quantitative and analytical skills to accurately interpret domain-specific scientific literature, to design sound empirical studies, and to perform well-conceived statistical analyses. These programs serve traditional students engaged in comprehensive learning as opposed to serving a more limited pedagogical purpose. They do not serve to build the same skills as the PSM nor cater to the needs of working professional students which allow the enrollees to add competencies and skills to their portfolios.

There are four existing OSU graduate programs that are more closely related to the proposed PSM: the MS program offered by CSE, the MS and Master of Applied Statistics (MAS) programs offered by the Department of Statistics, and the Specialized Master's in Business Analytics (SMB-A) program available from the Fisher College of Business. However, the PSM-TDA program differs from all four. The CSE and Statistics MS degrees are based on curricula that emphasize rigorous technical training in their respective disciplines. They often represent an intermediate step in a student's path toward a PhD degree. However, to some in CSE they provide an entryway to positions in the computing industry and in applied statistics. The MAS and SMB-A degrees have a more applied focus. However, these degrees differ from the PSM-TDA in their distinct targeted student populations and learning outcomes. This is evidenced in the stated goals of each degree:

- MAS program: *"to prepare graduate students to enter positions in applied statistics in business, industry, and government."*
- SMB-A program: *to equip students "with an understanding of the science of data analytics and its implication for business innovation, productivity and growth."*
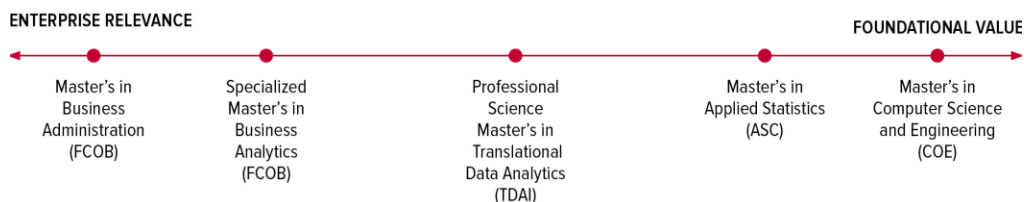
Given the inclusion of the special track on Design and Visualization, the proposed 33-credit-hours PSM degree will be one of a kind in DSA training in the world. Existing DSA programs have not included design thinking into the curriculum. This pedagogical approach will facilitate translation and application of data analytics into various application domains. The students of this program will not only be able to create sophisticated workflows for Big Data but will also be able to design viable user interfaces and tell compelling data stories. In closing, the stated goal of the proposed PSM-TDA degree program is "*to prepare professional students to be adept at conducting BIG DATA analysis at scale for improving enterprise productivity and profitabilit*y".

VI. GENERAL REQUIREMENTS, CURRICULUM DESIGN, & LEARNING GOALS

A. GENERAL REQUIREMENTS

a) Requirements for admission

1. **Admission requirements of the Graduate School:** {Items below excerpted from section 2.2 of the 2018-2019 Graduate School Handbook: https://gradsch.osu.edu/handbook/all#2-2}.
   Admission Criteria. An applicant must submit documentation that demonstrates fulfillment of the following admission criteria or equivalent qualifications:
   a. an earned baccalaureate or professional degree in any subject from an accredited college or university by the expected date of entry.
   b. a minimum of a 3.0 cumulative grade-point average (CGPA) (on the 4.0 scale used at this university) in the last degree earned by the applicant relevant to the program of study. For international students, the CGPA is calculated on the home institution's grading scheme and the grade key on the transcript is then utilized to approximate an equivalent

US grade based on the educational system of that country. Information about the degree programs and grading systems for the top 50 sending countries can be found at the Graduate and Professional Admissions website (https://gpadmissions.osu.edu/secure/GP_resources/Resources/profile/).

    c. prerequisite training that will enable the student to pursue the graduate program to which admission is sought

    d. a minimum score of 550 on the old or a minimum score of 19 on each section of the new paper-based Test of English as a Foreign Language (TOEFL), 79 on the internet-based TOEFL, 82 on the Michigan English Language Assessment Battery (MELAB), or 7.0 on the International English Language Testing System (IELTS). This requirement applies only to an applicant from a country where the first language is not English, unless a bachelor's degree or higher was earned in an English-speaking country

    e. Any exception to the above requirements will be considered on case-by-case basis.

2. **Additional admission requirements for the PSM-TDA program**:
   a. GRE General Test **or** 3 years of relevant professional experience is required.
   b. Applicants should have a minimum of 1-year of relevant professional experience.
   c. Students are expected to have completed courses that provide ample background in any of the following areas: computing, quantitative, and/or design/visualization skills at the undergraduate level or above from an accredited college or university by the expected date of entry.
   d. Students should have adequate experience with data analysis or work in a business field with a technology focus.
   e. Any exception to the above requirements will be considered on case-by-case basis.

The table below presents prototypical profiles of students who are envisioned to enroll in the proposed PSM-TDA program. If students do not fit the profiles indicated below but otherwise meet the minimum criteria above, they are encouraged to apply.

Profile	Degree Requirement	Bachelor's Degree	Professional Experience	Entrance Exam Requirement	Existing Skills/Expertise	Skills/Expertise Area to be Developed in PSM-TDA Program
1	BS	**DATA-STEM:** Engineering, Statistics, Mathematics, Computer Science	1-3 years	GRE (if needed).	Analytical/computing/ technical skills Foundational design/ visualization skills -Demonstrated logical thinking and problem-solving capabilities	Visualization/Design Business/Enterprise
2	BS, BA	**STEM:** Biology, Chemistry, Psychology	> 3 years	None	Basic foundational analytic and technical skills Basic to mid-level experience with data analysis Demonstrated logical thinking and problem-solving capabilities	Visualization/Design Business/Enterprise Computing skills
3	BA, BS	**NON-STEM:** Sociology, Humanities, Business, Finance, Communications, Design, Marketing	>3 years	None	Basic foundational computing, quantitative, and/or design/ visualization skills Basic to mid-level experience with data analysis or some experience working in a business field with a technology focus Demonstrated logical thinking and problem-solving capabilities	Visualization/Design Business/Enterprise Computing skills Analytical skills

b) Requirements for graduation

1. Graduation requirements of the Graduate School: {Items below excerpted from section 6.6 of the 2018-2019 Graduate School Handbook: https://gradsch.osu.edu/handbook/all#6-6}

   a. submission of the Application to Graduate form to the Graduate School no later than the third Friday of the semester (or third Friday of summer term) in which graduation is expected
   b. registration for at least three graduate credit hours during the autumn or spring semester or summer term in which graduation is expected
   c. completion of a minimum of 30 graduate credit hours. Eighty (80) percent of those required credit hours must be completed at this university over a period of at least two semesters
   d. graduate cumulative grade-point average of at least 3.0
   e. receipt of final grades in the University Registrar's Office by the published deadline.
   f. completion of the master's degree requirements established by the Graduate Studies Committee

2. Additional graduation requirements for the PSM-TDA:

   a. Completion of all required coursework for the program (as outlined below) with a cumulative minimum GPA of 3.0 and minimum grade of B- in each course.
   b. Satisfactory completion of a required capstone project.

B. CURRICULUM AND COURSE SYNOPSIS

Development of the Curriculum

During 2016-2017, the Translational Data Analytics Institute (TDAI) conducted a comprehensive examination of DSA-related academic programming at OSU. In addition, the TDAI held a roundtable with industry partners. Among the recommendations to make The Ohio State University a leader in DSA training, the creation of a Professional Science Master's degree (PSM) in translational data analytics (TDA) was accorded the highest priority. Subsequently, TDAI has conducted a series of information sessions with students, faculty, and industry partners to gather input for building a successful PSM-TDA program.

In early 2018, the TDAI team used this input to identify primary learning objectives and built a preliminary curriculum for the PSM program. The draft curriculum included three broad areas of study:

1. A set of foundational courses to acquire essential and applied skills in modern data analysis and computer science. The curriculum includes exposure to elements of common programing languages used in DSA applications.
2. A set of courses focusing on track-specific topics. In the initial phase of development of the PSM, the TDAI team has settled on a track that covers complementary aspects of data visualization. As the PSM program grows, we envision developing additional tracks focusing on other elements of DSA practice, such as decision science.
3. A set of courses and seminars incorporating experiential components within the PSM to focus on connecting students to community and business partners.

The principal partners working on the foundational and experiential components on campus have been the CSE and Statistics departments. The Advanced Computing Center for the Arts and Design (ACCAD) and the Design department have contributed mostly to the visualization track.

After preparing a draft curriculum, the TDAI managing team, in collaboration with BHEF, convened a second roundtable with TDAI's industry and local community partners. The focus of the second roundtable was principally to obtain feedback on the proposed curriculum and data visualization specialization. Additionally, the managing team desired to identify directions along which the curriculum could be modified and improved to better serve students and community partners.

This second roundtable involved 46 representatives from over 30 organizations, including industry, government, and nonprofit organizations. We believe this broad engagement with entities beyond industry demonstrates the potential and interest in our potential PSM offerings.

Relative to our community partners, TDA desired to explore where employers could best engage

in the program, define and outline effective applied learning experiences, and cultivate relationships between TDA and their organization for purposes of hiring and recruiting. Further, partners provided insight into skills gaps and workforce needs. The roundtable resulted in refinement of the curriculum to its current form as described in other parts of this proposal. The TDAI managing team was also better able to adjust course offerings and content to more precisely fit the profile and needs of the employers. Excitingly, the refined curriculum better differentiates the technical nature and goals of the proposed PSM-TDA program from those of other related programs at OSU. Specifically, the managing team added emphasis on business and ethical aspects of data analytics and added flexibility to connect the program to industry-specific domains. The roundtable discussion also helped the TDAI managing team to address logistic and educational requirements of the experiential components and capstone projects.

a) Curriculum overview

The general curriculum of the program is articulated around four major instructional modules:

- Five foundational courses addressing key computational and data analytics topics.
- Three core courses in data design and visualization for the first specialization. Future development of additional specialization tracks is envisioned, as dictated by the market need.
- A two-semester, capstone course sequence with a strong emphasis on experiential learning.
- Three multi-disciplinary seminars, focusing on data management, research methods and professional development.

As shown in the summary table below, the proposed PSM-TDA program can be completed in five semesters, part-time for a total of 33 credit hours. It is possible that some students may have received instruction in the salient topics of the program. However, the proposed curriculum is unique in that it incorporates design thinking into traditional topics of data analytics. We do not anticipate that many students will have received this unique combination of instruction. The emphasis of this program is also on practical and experiential learning which will make it attractive for students with a previous, more specialized data analysis or design background. At this point, we do not anticipate offering exams for students to skip courses based on previous experience.

Some courses have prerequisites and those have been noted on the compiled short form syllabi. All courses will be restricted in enrolment to only students in the PSM-TDA. The provided short form syllabi also note this as well.

Initial requirements to enter the degree program will be based on the named criteria under the section titled "Admission Criteria" within the proposal. No additional coursework will be required for entry. Prerequisites within this program only include satisfactory completion of coursework within the curriculum. When appropriate, we have named prerequisites which are required to progress on the short form syllabi provided.

All courses are lock-step, sequential and required. Courses may not be rearranged or moved. Situations where students fall out of sequence due to personal circumstances, performance or standing will be addressed on an individual basis. Some options include the following:

- The student may remain active in the program and enroll in the course the next time it's available. They may not progress until all prerequisites for the next courses are satisfied;
- The student will not continue in their original cohort, with the option to return the next time the course is offered to complete the remaining program as designed;
- The student may be offered an "incomplete" with an assigned deadline by which they would need to satisfactorily complete courses.

All courses will be taught at the graduate level with graduate level content. The courses sourced from ACCAD and Design already exist and are offered at the Graduate level. Specific sections will be offered to TDAI-PSM students under the GRADSCH numbering structure. The computing courses offered by the Department of Computer Science impart skills and knowledge on par with its regular offerings at the graduate level. Further, the emphasis on hands-on experiential learning has been incorporated into the PSM-TDA offerings. For courses taught by Statistics, course content is comparable in breadth and scope to that of courses already offered for graduate students from other departments seeking to build data analysis skills. Overall, all these courses justify their position as graduate level content in part because they integrate a broad set of concepts and incorporate substantial content into a condensed, rigorous curriculum. Additionally, they all have significant focus on experiential learning relevant to working professional students.

The 5000 level course numbers were selected to follow the numbering structure of similar courses in ACCAD and the Departments of Computer Science and Engineering, Design and Statistics. Additionally, because students will be coming from a variety of backgrounds and not just those with intense training in the principal disciplines, we believe the 5000 level is more appropriate.

In the table below, and the compiled short form syllabi, we have inserted tentative course numbers, subject to change. Some courses are being newly developed and may not yet have numbers for cross-listing. Upon formal approval of the course proposals, the courses will be assigned official GRADSCH numbers that follow an agreed upon taxonomy. The numbers of existing courses follow the numbering scheme of the teaching departments, with the departments' specific handles replaced by GRADSCH. The three multi-disciplinary 1-credit seminar courses will offer the stated themes. Their content will adjust based on the specific expertise and interest of the instructors of record and guest speakers invited from the partnering local community.

Y1-Fall	Y1-Spring	Y2-Summer	Y2-Fall	Y2-Spring
GRADSCH 5401: Data Analytics Foundations I, including R and Python (3c) **Teaching department:** STAT	**GRADSCH 5402:** Data Analytics Foundations II, including R and Python (3c) **Teaching department:** STAT	**GRADSCH 5620:** Practical Learning and Mining for Big Data (3c) **Teaching departments:** CSE + STAT (1.5 CH each)	**GRADSCH 5141:** Interactive Arts Media II: UI/UX (3c) **Teaching department:** ACCAD	**GRADSCH 5150:** Emerging Trends in Data Visualization (3c) **Teaching department:** ACCAD
GRADSCH 5621: Big Data Computing Foundations I: End-to-end workflows, incl. visualization (3c) **Teaching department:** CSE	**GRADSCH 5622:** Big Data Computing Foundations II: Scalable computing, data management (3c) **Teaching department:** CSE	**GRADSCH 5505:** Information Design (3c) **Teaching departments:** DESIGN+CSE	**GRADSCH 5911:** Practicum /Capstone I (3c) **Teaching department:** TBD	**GRADSCH 5912:** Practicum /Capstone II (3c) **Teaching department:** TBD
	GRADSCH 5625: Seminar I: Data governance (1c) **Teaching department:** TBD	**GRADSCH 5626:** Seminar II: Research methods (1c) **Teaching department:** TBD	**GRADSCH 5627:** Seminar III: Professional development (1c) **Teaching department:** TBD	
6 cr total	7 cr total	7 cr total	7 cr total	6 cr total

C. STUDENT LEARNING OUTCOMES

General Learning Goals of the PSM-TDA Degree
Upon graduation students will demonstrate:

1. **Knowledge of fundamental principles of computer science.** They will exhibit methodological understanding and experiential competency, enabling them to perform relevant workplace tasks such as: identifying common data sources and data structures; using information technology and programming environments to convey and retrieve information; and identifying processes and mechanisms commonly used to retrieve, assess, re-engineer, enrich, manipulate, visualize, and amalgamate data.

2. **Knowledge of fundamental principles of data analysis, statistical inference, and machine learning.** They will exhibit methodological understanding and experiential competency, enabling them to perform relevant workplace tasks such as: apply appropriate methods, models, and techniques from topics of data mining, learning methods, optimization, probability, statistics, and simulation to analyze data; generate explanations to answer the research and/or business questions under scrutiny; produce

predictions of future outcomes for the process under study. Critical thinking skills, acquired through coursework and experiential practice, enabling them to: ask relevant project-related questions; identify appropriate methodological approaches to produce useful answers; design methods to evaluate and assess validity of outcomes; evaluate requirements and specifications to recommend effective, analytics-based solutions.

3. **Translational competency**, enabling them to transfer, apply, and validate analytic methods and findings across domains. Also exhibit understanding of data governance obligations and challenges, as well as emerging legal and ethical issues with data analytics, including privacy and security best practices.

4. **Mastery of professional skills**, including interpersonal communication, designing and delivering presentations, teamwork, and leadership in diverse teams representing various organizational environments. They will exhibit mastery at communicating recommendations through effective storytelling, both orally and in the format of written reports, translating technical solutions to audiences with varied backgrounds.

Learning Goals of the Visualization Track

Students will demonstrate:

1. An ability to integrate artistic, methodological and experiential technical abilities for creating visual stories of data based upon a synthesis of interdisciplinary knowledge in the context of data usage in workplaces and enterprises.

2. A fundamental understanding of design principles that contribute to and enhance readability, legibility, aesthetics and visual comprehension allowing for the amplification of insights, and patterns inherent in the data and the placement of the insights into real-world contexts resulting in useful prediction of trends and events.

3. The application of foundational aspects of both user experience and human computer interaction design that enhances user understanding and use of data visualization to design user interfaces that are both meaningful and effective in a variety of workplace settings.

4. Proficiency in designing and implementing visual communication solutions of information and data analysis by resorting to practical knowledge of design, human-computer interaction, and visualization, and their skills in visual graphics programming for meaningful and contextual story telling.

5. The ability to evaluate and choose appropriate existing and emergent tools for visualization and interaction based on cognitive fit and background of users, analysis of workplace needs and platform.

VII.   EXPERIENTIAL COMPONENT/CAPSTONE

A key recommendation from both of TDAI's employer roundtables has been to incorporate high-quality, experiential learning into the PSM-TDA program to ensure industry relevancy. It also

serves as a critical bridge between a student's work experience and educational coursework. Therefore, the proposed PSM-TDA program will incorporate experiential activities throughout all its course offerings. Beginning with the foundation courses in data analytics and computing, and the subsequent course on practical learning, students will be exposed to realistic learning activities that emphasize the application of modern analytics tools to the solution of practical questions. This pedagogical framework will extend to the track-specific courses, in which the illustrative activities will concentrate on demonstrating how to construct and implement effective visualization methods in real-life settings.

The experiential elements of the program will culminate in a required two-semester Practicum/Capstone course sequence, for a total of six credit hours. A key element of the capstone experience will consist in the direct engagement of our community partners including employers from industry, government, and non-profits to formulate challenge questions. They will also provide data relevant to answer those questions. Collaborations with business partners will require they provide data with a challenge problem and financial support for the execution of the project. Among other things, this financial support will allow the PSM-TDA program to offer release time to faculty project advisors with specific domain knowledge to help supervise the projects. No deliverables will be expected of the students because the capstone project must be viewed as a learning experience rather than a consulting assignment. This approach has been successfully adopted by other programs on campus including Computer Science and Engineering, the Fisher College of Business for their degree offerings in business analytics and the Undergraduate Major in Data Analytics. Although the Multidisciplinary Capstone Program offered by the Department of Engineering Education imparts less experience in data analytics, several successful elements of that program will be eventually adopted. We draw upon all these programs as described below.

A. LOGISTICS

Practical organizational elements of the capstone experience will be as follows.

- Students will work in teams of suitable size (3 or more).
- Community partners will be recruited by the PSM-TDA Faculty Mentor, TDAI Managing Director and Program Coordinator.
- The community partners will present their projects to the students to pique their interest in the practical questions for which they need answers.
- The PSM-TDA Faculty Mentor will oversee the formation of teams and the project assignments.
- To foster a broader array of perspectives, students will not be generally assigned to projects involving their own employers. Exceptions to this general rule may be considered on a case-by-case basis.
- Each team will establish contact with a community partner supplying the problem and develop an ongoing partnership leading to a coherent, refined formulation of the problem and a satisfactory solution.
- In addition to the PSM-TDA Faculty Mentor, each team may be assigned a faculty project advisor with domain specific expertise (as needed). Typically, this faculty advisor will be

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one of the TDAI affiliated faculty members, but non-affiliated faculty members will also be engaged.

- The PSM-TDA Faculty Mentor will monitor all projects to ensure that the learning experience has uniform requirements to guarantee academic integrity.

The OSU Office of Legal Affairs has developed a template for a proposed "Cooperative Agreement for Student Projects" between The Ohio State University on behalf of its Office of Sponsored Programs and the participating community partners. The Multidisciplinary Capstone Program of the Department of Engineering Education has used this working template to establish collaborative agreements for undergraduate capstone projects. TDAI will employ a similar set of documents to establish working relationships with various partners.

B. LEARNING GOALS

The learning goals of the capstone courses and of the capstone project are in concurrence with the general learning goals of the PSM-TDA degree, with special emphasis on translational competency and mastery of professional skills. Accordingly, in their capstone projects, the students will be expected to demonstrate mastery of soft skills, including design thinking and presentation capabilities, in addition to a keen familiarity with the required technical skills.

Specific assessment of the learning goals for the capstone experience will occur in conjunction with the assessment of general Learning Goals 3 and 4 for the PSM-TDA program (pg. 21). These are the learning goals most directly relevant to the students' experiential formative experience. The assessment process and rubric are described in detail later in Section VIII. The goals and their measurable learning outcomes are paraphrased herewith for ease of reference.

General Learning Goal 3: Translational competency.

The following *learning outcomes* are associated with Learning Goal 3:

1. Ability to transfer, apply, and validate analytic methods and findings across domains.
2. Competence in the best practices of the student's specialization track.
3. Knowledge of and ability to comply with data governance obligations and challenges, as well as understanding of emerging legal and ethical issues with data analytics, including privacy and security best practices.

General **Learning Goal 4:** Mastery of professional skills.

The following *learning outcomes* are associated with Learning Goal 4:

1. Level of interpersonal communication skills, including presentation design and delivery.
2. Propensity for teamwork and leadership in a diverse team representing various organizational environments.
3. Ability to communicate recommendations through effective storytelling, both orally and in the format of written reports, translating technical solutions to audiences with varied backgrounds.

C. PERFORMANCE EVALUATION

Performance evaluation of the students' performance in the capstone courses will be based on the following elements:

- Active and productive participation in the in-class activities and in the capstone project.
- Elaboration of mid-semester interim reports and final reports in each of the two capstone courses.
- Progress-report poster presentation at the end of the first semester.
- Final oral presentation at the end of the second semester.
- No deliverables for the companies will be expected.
- Project evaluation will be performed by the course instructor(s), PSM-TDA Faculty Mentor, and faculty advisor(s).
- The PSM-TDA Advisory Board members will observe the final presentations to assist with the overall evaluation of the quality of the degree program but will not be involved in the evaluation of the students' performance.

VIII. PROGRAM QUALITY ASSURANCE

The standards for program quality assurance will meet the OSU requirements for annual program assessment as follows:

1. The TDAI Faculty Director, the PSM-TDA Faculty Mentor and Program Coordinator will manage the annual assessment required by the Graduate School.
2. A formal assessment plan has been established and is described below. The learning goals of the PSM-TDA program inform the assessment plan. The plan includes procedures of data collection and analysis for the evaluation of student performance and the improvement of student learning outcomes.

A. FORMAL ASSESSMENT PLAN

The ensuing assessment plan is currently modeled after the assessment plans of the graduate programs in the Departments of Statistics from which it borrows structure and language. These assessment plans have been implemented successfully over the past several years and have produced valuable quantitative data that enables informative evaluation of the programs over time and suggest directions for improvement. We foresee that this general structure of the assessment plan will be similarly successful for the proposed PSM-TDA program. Since the PSM-TDA degree draws from several disciplines and programs, TDAI will include additional assessment elements as needed.

The PSM-TDA Faculty Mentor and Program Coordinator will be responsible for the overall assemblage and processing of the assessment data. The TDAI Faculty Director will lead the interpretation of the results and lead the preparation of the summaries of the annual assessment exercise. She/he will work closely with the PSM-TDA Faculty Mentor and Program Coordinator. Further, the PSM-TDA Faculty Mentor and Program Coordinator will work with TDAI's Managing Director, especially towards the accessibility and quality assessment of the

capstone material as it pertains to external outreach. This group (TDAI Faculty Director and Managing Director together with the PSM-TDA Faculty Mentor and Program Coordinator) forms the PSM-TDA Administrative Core Team. The other salient participants in the assessment are the PSM-TDA External Advisory Board (required by the PSM National Commissioning body) and the Directors of Graduate Studies in participating departments who will continuously work with the PSM-TDA Administrative Core Team. The PSM-TDA Administrative Core Team will be advised by a PSM-TDA Faculty Advisory Committee. The PSM-TDA Faculty Advisory Committee will be comprised of the TDAI Faculty Director or their designee, PSM-TDA Faculty Mentor, the Chairs of the GSC in the participating departments, and a faculty member from the Graduate School.   One PSM-TDA student per cohort will be elected by their peers (or volunteer if not contested) to serve as non-voting members on the committee. The students will not be involved in any FERPA protected items if they are taken up by the Committee. The students will serve as liaisons between this team and the student body on issues relevant to their experience.

The PSM-TDA Faculty Advisory Committee will oversee the following activities (but not limited to):

- Devising guidelines or a handbook for the PSM-TDA.
- Admission requirements and selection of candidates
- Recruitment of M/P status faculty to serve as advisors for PSM-TDA students
- Curriculum requirements, course offerings and modifications
- Student petitions and other issues

General Learning Goals of the PSM-TDA Degree.
To reiterate, upon graduation, students will demonstrate:

1. **Knowledge of fundamental principles of computer science.**

2. **Knowledge of fundamental principles of data analysis, statistical inference, and machine learning.**

3. **Translational competency.**

4. **Mastery of professional skills**.

Assessment of Learning Goal 1: Knowledge of fundamental principles of computer science. The following *learning outcomes* are associated with Learning Goal 1:

1. Ability to identify common data sources and data structures.
2. Ability to use information technology and programming environments to convey and retrieve information.
3. Ability to implement the processes and mechanisms commonly used to retrieve, assess, re-engineer, enrich, manipulate, visualize, and amalgamate large scale data.

Assessment rubric:

The PSM-TDA program will directly assess students' achievement of the stated learning outcomes by scoring their performances on selected questions embedded in the final exam of the course *Big Data Computing Foundations II.* Appropriate questions addressing each learning outcome will be used. For each learning outcome, the course instructor will assess each student on the ordinal scale: "High Proficiency," "Satisfactory Proficiency," "Some Proficiency," or "Low Proficiency." This will be done separately from the determination of the overall performance on the exam. The course instructor will be responsible for communicating the rating summaries and remarks to the PSM-TDA Program Coordinator.

Criterion: If at least 80% of the assessment ratings of students in the PSM-TDA program are in the "High Proficiency" or "Satisfactory Proficiency" categories, we will consider this as evidence of success in achieving Learning Goal 1.

Use of Data: Aggregated data for each learning outcome will be examined by the PSM-TDA Administrative Core Team on an annual basis. If the data do not meet our criteria or are otherwise disappointing, the team will explore possible remedies, including meeting with students directly to discuss their performance, making improvements in course content, and making improvements in course delivery and learning activities within courses.

Assessment of Learning Goal 2: Knowledge of fundamental principles of data analysis, statistical inference, and machine learning.

The following *learning outcomes* are associated with Learning Goal 2:

1. Ability to apply appropriate methods, models, and techniques to the analysis of data.
2. Ability to generate explanations to answer the research and/or business questions under scrutiny, to evaluate and assess the validity of outcomes, and to produce predictions of future outcomes for the process under study.
3. Ability to evaluate requirements and specifications to recommend effective, analytics-based solutions.

Assessment rubric:

The PSM-TDA program will directly assess students' achievement of the stated learning outcomes by scoring their performances on selected questions embedded in the final exam of the course *Data Analytics Foundations II.* Appropriate questions addressing each learning outcome will be used as in the assessment of Learning Goal 1. For each learning outcome, the course instructor will assess each student on the ordinal scale: "High Proficiency," "Satisfactory Proficiency," "Some Proficiency," or "Low Proficiency." This will be done separately from the determination of the overall performance on the exam. The course instructor will be responsible for communicating the rating summaries and remarks to the PSM-TDA Program Coordinator.

Criterion: [same as for Learning Goal 1]

Use of Data: [same as for Learning Goal 1]

Assessment of Learning Goal 3: Translational competency.

The following *learning outcomes* are associated with Learning Goal 3:

1. Ability to transfer, apply, and validate analytic methods and findings across domains.
2. Competence in the best practices of the student's specialization track.
3. Knowledge of and ability to comply with data governance obligations and challenges, as well as understanding of emerging legal and ethical issues with data analytics, including privacy and security best practices.

The PSM-TDA program will directly assess students' achievement of the learning outcomes above by scoring each student on the student's capstone project (including the process leading to its completion and its oral presentation). For each learning outcome, the project evaluation will be performed by the capstone course instructor(s), PSM-TDA Faculty Mentor, and faculty advisor(s) with input from the community partner supplying the project. They will assess each student on the ordinal scale: "High Proficiency," "Satisfactory Proficiency," "Some Proficiency," or "Low Proficiency." This will be done separately from the overall determination of whether the student passes the capstone course and will usually be accompanied by additional remarks regarding the attainment or non-attainment of the learning outcome, which will be specific to the student's project topic. The PSM-TDAI Faculty Mentor will be responsible for communicating the rating summaries and remarks to the PSM-TDA Program Coordinator.

Criterion: If at least 80% of the above assessment ratings are in the "High Proficiency" or "Satisfactory Proficiency" categories, we will consider this as evidence of success in achieving Learning Goal 3 for our PSM graduates.

Use of Data: Aggregated data for each learning outcome will be examined by the PSM-TDA Administrative Core Team on an annual basis. If the data do not meet our criteria or are otherwise disappointing, the team will explore possible remedies, including meeting with students directly to discuss their performance, and improving the guidance that we give students in preparing the capstone project.

Assessment of Learning Goal 4: Mastery of professional skills.

The following *learning outcomes* are associated with Learning Goal 4:

1. Level of interpersonal communication skills, including presentation design and delivery.
2. Propensity for teamwork and leadership in a diverse team representing various organizational environments.
3. Ability to communicate recommendations through effective storytelling, both orally and in the format of written reports, translating technical solutions to audiences with varied backgrounds.

Assessment Rubric: [same as for Learning Goal 3]

Criterion: [same as for Learning Goal 3]

Use of Data: [same as for Learning Goal 3]

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B. FURTHER ASSESSMENT AND EVALUATION

To evaluate the unique professional training nature of the program while aligning the program with other data analytics programs on campus, the following additional steps will be implemented.

a) The program will indirectly assess all the learning outcomes through an exit survey of all graduating students.
b) The program will record and analyze job placement data for all graduated students.
c) All assessment data will be shared and discussed annually with the program Advisory Board comprised of TDAI's Founding Partners and select representatives from chosen industry sectors. The board will also include faculty and advisors of existing data science programs. As needed, select OSU faculty will be invited to provide specific input.
d) Results and summaries of assessments will be shared with the Directors of Graduate Studies in each of the participating departments.
e) As part of the evaluation, informal benchmarking with other institutions will be conducted every five years.

C. EVALUATION OF INSTRUCTION

Evaluation of instruction will follow established OSU standards.

a) Faculty/Instructors associated with a TIU will be evaluated annually through a TIU review. The Chairpersons and Directors of Graduate Studies of participating departments will provide input on instruction and evaluate changes to content.
b) Faculty/Instructors not associated with any TIU (e.g., instructors hired directly by the TDAI) will be evaluated annually through a TDAI review led by the PSM-TDA Faculty Mentor.
c) At the end of each course, faculty will be evaluated by the enrolled students using standardized evaluation instruments followed across the University.

IX. UNIVERSITY APPROVALS

In progress.

X. CONSULTATIVE PROCESS

The following material was collected over the last 3 years to support the establishment of the graduate programs in data science and analytics.

A. During 2016-2017, TDAI conducted a comprehensive examination of DSA related academic programming at OSU. A long and a short version of the report are attached (see Appendices 7 and 8).
B. TDAI has conducted a market research through Eduventures to understand the labor market and student market of data analytics for our planned program (see Appendix 1).

C. TDAI organized two roundtables with TDAI's industry partners. A summary of the roundtables is attached (see Appendix 10).

D. TDAI has conducted a series of information sessions with students, faculty, and industry partners to gather inputs for building a successful PSM. Presentation slides from these information sessions are attached (see Appendix 9). Feedback from those who attended the meetings were positive. Suggestions were taken into consideration when developing the curriculum.

XI. COST ANALYSIS AND REVENUE SHARING MODEL

The proposed degree program is unique in many respects. The key issues to consider are:

- The TDAI will provide most of the logistic and administrative support but it is not an academic, degree-granting unit.
- The program is set up as a partnership between the departments of CSE, Statistics and Design in the Colleges of Engineering and Arts and Sciences. There is the possibility of future involvement of other academic units as more specializations are added to the program.
- The Graduate School has agreed to provide technical and administrative support.

For providing logistic and administrative support, TDAI has created the role of Internship and Student Programs Coordinator referred to as Program Coordinator throughout the proposal. Currently this position is filled by Mr. Joshua Roush who serves on the TDAI's staff. Further, it will also recruit a PSM-TDA Faculty Mentor who will oversee the academic content and the experiential aspects of the curricula. The Program Coordinator will interact with Faculty Mentor and TDAI's Faculty and Managing Directors. For all instructional matters, the Program Coordinator will work with the TDAI Faculty Director and the PSM-TDA Faculty Mentor. The Program Coordinator will work closely with the TDAI Managing Director on all matters of outreach and on discussions with our external and corporate partners. Please note that the PSM-TDA Faculty Mentor will be appointed in the imminent future.

TDAI is working with senior administration in the Colleges of Arts and Sciences, Engineering and the Graduate School and pertinent departments to create a 7-year model of projected revenues and costs. Under this proposed model, instructional costs are calculated based on a modular model of revenue sharing with the teaching colleges. The modular revenue sharing model assumes a current flat-rate compensation of $17,000 per credit hour taught (the number is subject to change). The Graduate School will collect revenues and distribute to the College that provides the instruction.

The individual departments and colleges will decide how to allocate their compensation. A possible example is as follows: A department commits to teaching three three-credit hour courses a year, generating $151,000 (subject to change) in instructional compensation. These funds could be used by the college to fund a tenure-track, clinical or lecturer faculty line.

This revenue model best suits the interdisciplinary nature of the program and better positions it for future expansion as additional partners become involved. This model will considerably simplify the task of welcoming additional partners.

Aggregate # of Students: We assume that 30 students will enroll each Fall in the 5-semester, part-time program. At steady state, there will be 60 students in the program in AU and SP and 30 students in SU. No attrition is currently accounted for.

Total Credit Hours: The program specifies a 33-credit hour requirement for a total of 990 credit hours taught each year.

Differential Fee: In addition to the tuition and subsidies collected, we intend to charge a differential fee for expenses.

Revenues are calculated distinguishing between **Total Revenues** and **Total Taxable Revenues.** Differential fee revenues are excluded from Total Taxable Revenues.

Instructional GTA's: We intend to employ GA teaching assistants to assist in instructional activities. Under the proposed model funding will go to the College/Department to fund a GTA.

Administrative Staff: This accounts for a 100% FTE PSM-TDA Faculty Mentor who will oversee teaching and supervising the experiential components of the program and a 50% FTE TDAI Program Coordinator.

Grad School and TDAI Tax: The graduate school and TDAI will assess a small tax (to be determined) only in the presence of a net profit.

General Supplies: Estimated costs for supplies needed to run the program (copying, advertising, etc.).

XII. ADDITIONAL RESOURCES

It is our goal that various participating units commit to providing curricular and instructional support as follows:

- Development and teaching of new courses.
- Adaptation and teaching of existing courses.
- Compensation models for TDAI and the participating Colleges and academic units for the provision of instructional, curricular, and administrative support.

To meet these requirements, TDAI will lead to define:

- Clear position descriptions and roles of the PSM-TDA Faculty Mentor, the likely recruitment of suitable candidate and her/his affiliation to participant departments. The affiliation (Computer Science, Statistics, Design, etc.) will be determined by the training and skill sets of chosen candidates.
- Curricular and Instructional support from departments. TDAI will work with Chairs and Graduate Chairs of participating departments for curriculum and instructional support. Operational and financial agreements between all participants. TDAI will enter into agreements regarding costs to all parties and institutionalize the above revenue sharing

model with all participating entities to. First it will create an agreement with the Graduate School for the administrative support of the PSM-TDA degree program. Further, TDAI and Graduate School will work administrations of participating colleges and units to create mechanisms of administrative and financial support. Appropriate agreements will be detailed in MOUs between TDAI and participating entities. It is also expected that, through tuition charges, the PSM-TDA program will provide a reliable revenue stream to TDAI and the various participating units, as per the blueprint in various MOUs. New resources committed to the TDA-PSM program will not interfere with the current pedagogical activities of the participating units if so deemed. Further, participating units will have freedom to recruit faculty of appropriate training and rank (clinical faculty, tenure track, instructors, etc.) per the market demands they operate with.

AMENDMENTS TO THE *RULES OF THE UNIVERSITY FACULTY*

Synopsis: Approval of the following amendments to the *Rules of the University Faculty*, is proposed.

WHEREAS the University Senate, pursuant to rule 3335-1-09 of the Administrative Code, is authorized to recommend through the president to the Board of Trustees the adoption of amendments to the *Rules of the University Faculty* as approved by the University Senate; and

WHEREAS the proposed changes to rules 3335-8-27.1 and 3335-8-32 in the *Rules of the University Faculty* were approved by the University Senate on November 14, 2019; and

WHEREAS the proposed elimination of rule 3335-3-18 and the creation of rule 3335-3-28 in the *Rules of the University Faculty* were approved by the University Senate on November 14, 2019:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves that the attached amendments to the *Rules of the University Faculty* be adopted as recommended by the University Senate.

Topic:

Amendments to the *Rules of the University Faculty*

Context:

The University Senate has recommended revisions to the Rules of the University Faculty to address two topics:

1. **Renaming the title of the "director of libraries" to the "dean of libraries"**

   - "Dean of libraries" is the norm in higher education, and this title conforms with the principle that tenure eligible faculty are led by deans, not directors

   - Ten of the Big Ten universities employ a dean of libraries. None, other than Ohio State, employ a director of libraries

   - The Office of Academic Affairs and the current director of libraries both support the proposed title change;

   - The elimination of rule 3335-3-18 and the creation of rule 3335-3-28 would address this issue and be consistent with the grouping of dean positions in chapter 3335-3 as part of a longer term logical resequencing of the entire chapter by the University Senate Rules Committee.

2. **Aligning grade forgiveness deadlines with withdraw deadlines**

   - The current deadlines for applying for grade forgiveness comes before students have any meaningful feedback about their performance and is out of sync with the deadlines for withdrawing from a course.

   - The current deadline of 5 p.m. is impractical or confusing when offices officially close at a time other than 5 p.m., such as during summer hours. This has caused difficulties for students and advisors.

   - Revisions to the 3335-8-27.1 grade forgiveness rule and to 3335-8-32 withdrawal from courses include practical deadlines for each term and replaces all instances of a 5 p.m. deadline with "close of business."

FACULTY PERSONNEL ACTIONS

BE IT RESOLVED, That the Board of Trustees hereby approves the faculty personnel actions as recorded in the personnel budget records of the university since the August 30, 2019, meeting of the board, including the following appointments, appointments/reappointments of chairpersons, faculty professional leaves and emeritus titles:

Appointments

Name:	FREDERICK L. ALDAMA
Title:	Distinguished University Professor
College:	Arts and Sciences
Term:	July 1, 2019

Name:	JORDAN M. CLOYD
Title:	Ward Family Surgical Oncology Designated Professorship
College:	Medicine
Term:	December 1, 2019 through June 30, 2024

Name:	LIAN DUAN
Title:	Honda Chair in Transportation
College:	Engineering
Term:	September 1, 2019 through August 31, 2024

Name:	VADIM FEDOROV
Title:	Corrine Frick Research Chair in Heart Failure and Arrhythmia
College:	Medicine
Term:	December 1, 2019 through June 30, 2024

Name:	DOROTA A. GREJNER-BRZEZINSKA
Title:	Distinguished University Professor
College:	Engineering
Term:	July 1, 2019

Name:	ZIHAI LI
Title:	Klotz Chair in Cancer Research
College:	Medicine
Term:	December 1, 2019 through June 30, 2024

Name:	LI-CHIANG LIN
Title:	Umit S. Ozkan Professorship in Chemical and Biomolecular Engineering
College:	Engineering
Term:	September 1, 2019 through August 31, 2024

Name:	DEBORAH JONES MERRITT
Title:	Distinguished University Professor
College:	Michael E. Moritz College of Law
Term:	July 1, 2019

FACULTY PERSONNEL ACTIONS (cont'd)

Appointments
(cont'd)

Name:	*AMY M. MOORE
Title:	Robert L. Ruberg MD Alumni Chair in Plastic Surgery
College:	Medicine
Term:	November 15, 2019 through November 14, 2023

Name:	*SAYOKO E. MOROI
Title:	William H. Havener, MD, Chair in Ophthalmology Research
College:	Medicine
Term:	January 6, 2020 through January 5, 2024

Name:	*OLUYINKA O. OLUTOYE
Title:	E. Thomas Boles Jr. MD Chair in Pediatric Surgery
College:	Medicine
Term:	August 1, 2019 through July 31, 2023

Name:	CARRIE SIMS
Title:	Olga Jonasson, MD Professorship in Surgery
College:	Medicine
Term:	January 6, 2020 through June 30, 2024

Name:	*AYLIN YENER
Title:	Roy and Lois Chope Chair in Engineering
College:	Engineering
Term:	January 1, 2020 through December 31, 2025

*New Hire

Reappointments

Name:	NICHOLAS A. BRUNELLI
Title:	H.C. "Slip" Slider Professorship in Chemical and Biomolecular Engineering
College:	College of Engineering
Term:	September 1, 2018 through August 30, 2023

Name:	B. SCOTT GAUDI
Title:	Thomas Jefferson Chair for Discovery and Space Exploration
College:	College of Arts and Sciences
Term:	September 1, 2019 through August 31, 2024

Name:	ANIL MAKHIJA
Title:	Dean
College:	Max M. Fisher College of Business
Term:	November 21, 2019 through June 30, 2024

DEGREES AND CERTIFICATES

Synopsis: Approval of Degrees and Certificates for autumn term 2019, is proposed.

WHEREAS pursuant to paragraph (E) of rule 3335-1-06 of the Administrative Code, the board has authority for the issuance of degrees and certificates; and

WHEREAS the faculties of the colleges and schools shall transmit, in accordance with rule 3335-9-29 of the Administrative Code, for approval by the Board of Trustees, the names of persons who have completed degree and certificate requirements:

NOW THEREFORE

BE IT RESOLVED, That the Board of Trustees hereby approves the degrees and certificates to be conferred on December 15, 2019, to those persons who have completed the requirements for their respective degrees and certificates and are recommended by the colleges and schools.