Strengthening the AI, Big Data & Analytics *Ecosystem* @ WSU

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Champion: Dr. Keith Whitfield, Provost

2nd Annual AI, Big Data & Analytics Town Hall Meeting with the Provost | Nov 4, 2019

Program

Time	Program
3:00PM	**Welcome Remarks: Provost K. Whitfield**
3:05PM	**Ecosystem Vision & Progress: Prof. R.B. Chinnam**, Director, AI, Big Data & Business Analytics Group - Mission, Education, Research, Engagement, Services
3:15PM	**Big Data Computing Facilities: Daren Hubbard**, Associate VP & CIO - Grid, Web-Based Computing, Storage, Hadoop/Spark Cluster, VMs, National/External Resources
3:20PM	**TED Style Talks from WSU Faculty:**

Prof. Carol Miller Director, Healthy Urban Waters, Civil & Environmental Engineering		**Prof. Jukka Savolainen** Past Director, National Archival of Criminal Justice Data, Criminal Justice	

Prof. Phil Levy Assistant VP & Associate Chair for Research, Emergency Medicine

Time	Program
4:15PM	**Open Discussion: What are your needs?**
4:40PM	**Reception & Posters**

Vision for WSU's AI, Big Data & Analytics Ecosystem

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VISION:

"To be a premier center of innovation in AI, big data science and analytics"

OPERATING PHILOSOPHY:

- Be a leading source of **data science and analytics expertise**
- **Leverage and reinforce strengths** of **diverse groups** across the university for synergistic collaborations that enable pursuit of **large research grants** and foster breakthroughs.
- Offer **leading edge educational and training programs**
- Actively **collaborate with industry** utilizing advanced research in computing tools and platforms
- Contribute to **development** of the broader **SE-Michigan community** through collaborative activities
- **Enhance university image and reputation**

Leadership & Steering Committees

Steering Committee

- K. Whitfield, Provost
- S. Lanier, OVPR
- F. Fotouhi, Engineering
- L. Hazlett, SoM
- S. Hartwell, CLAS
- R. Forsythe, Business
- D. Hubbard, C&IT
- H.A. Coates, Development

Ecosystem Directors

- R. Chinnam, Engineering
- D. Cinabro, CLAS
- M. Dong, Engineering
- S. Draghici, Engineering & SoM
- P. Gossman, C&IT
- P. Levy, SoM / OVPR
- T. Somers, Business
- L. Thompson, CUS

Proposed
AI, Big Data
Ecosystem
Organizational
Structure @
WSU

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AI, Big Data & Analytics Ecosystem @ WSU

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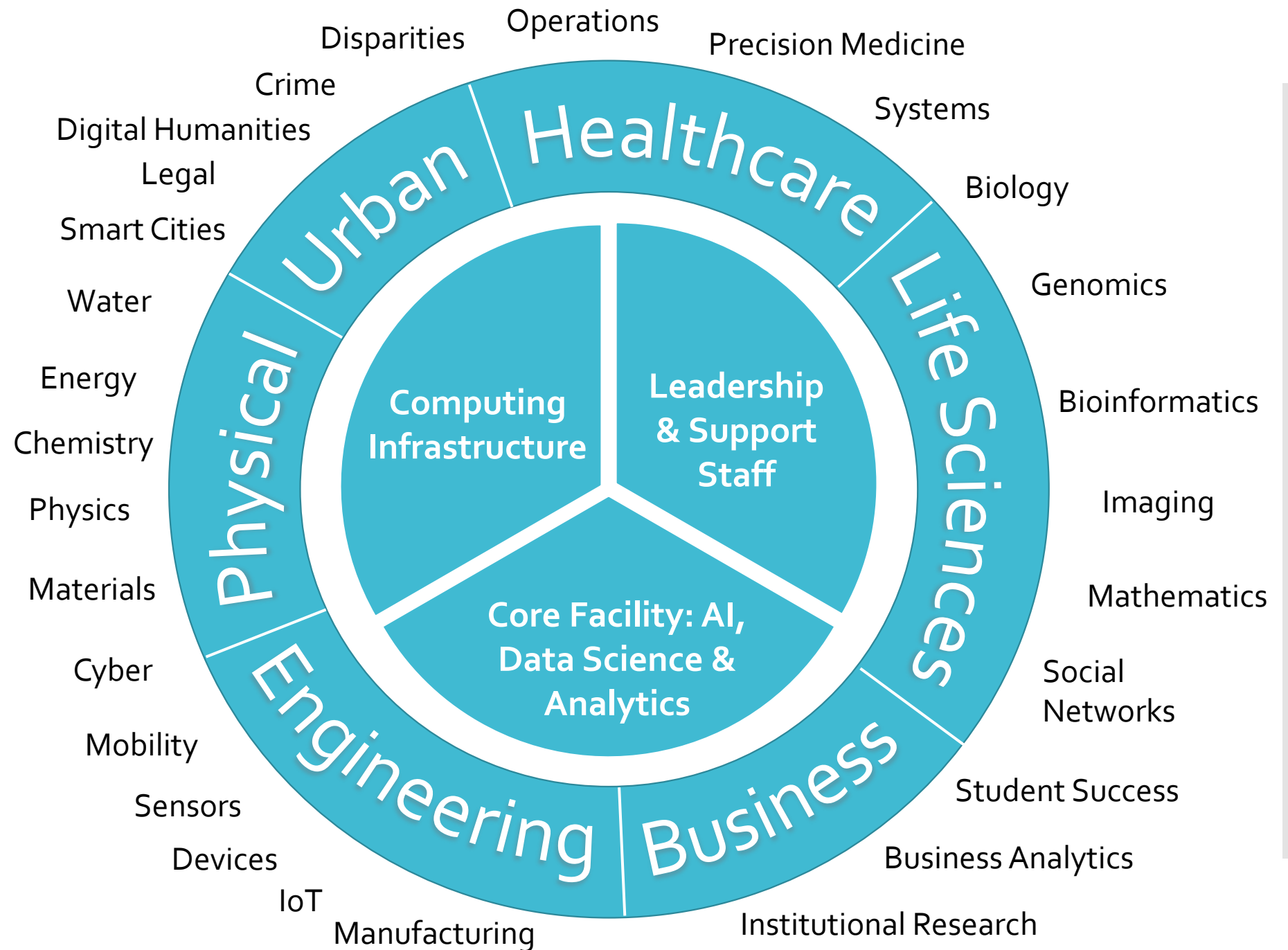
Accomplished

- AI, Big Data & Analytics Group
  - Annual Big Data Summits since 2014
    - ~500 Registrations from ~150 companies in recent years
  - M.S. in Data Science & Business Analytics
  - New Website: http://bigdata.wayne.edu
  - Group List-serve: bigdata@lists.wayne.edu

- Enhanced Computing Infrastructure & Staff
  - Hadoop/Spark Cluster, VMs, Web-Based Computing
  - NSF Grants to Strengthen the Grid & GPU Computing

- NSF's Midwest Big Data Hub
  - WSU Leads "Business Analytics" Spoke

Big Data Interdisciplinary Research Stimulus Grants

- Funding from the Provost
- Received 20 proposals and 4 were funded
- Priority given to proposals that sought cross-college collaborations and new collaborations

Accomplished

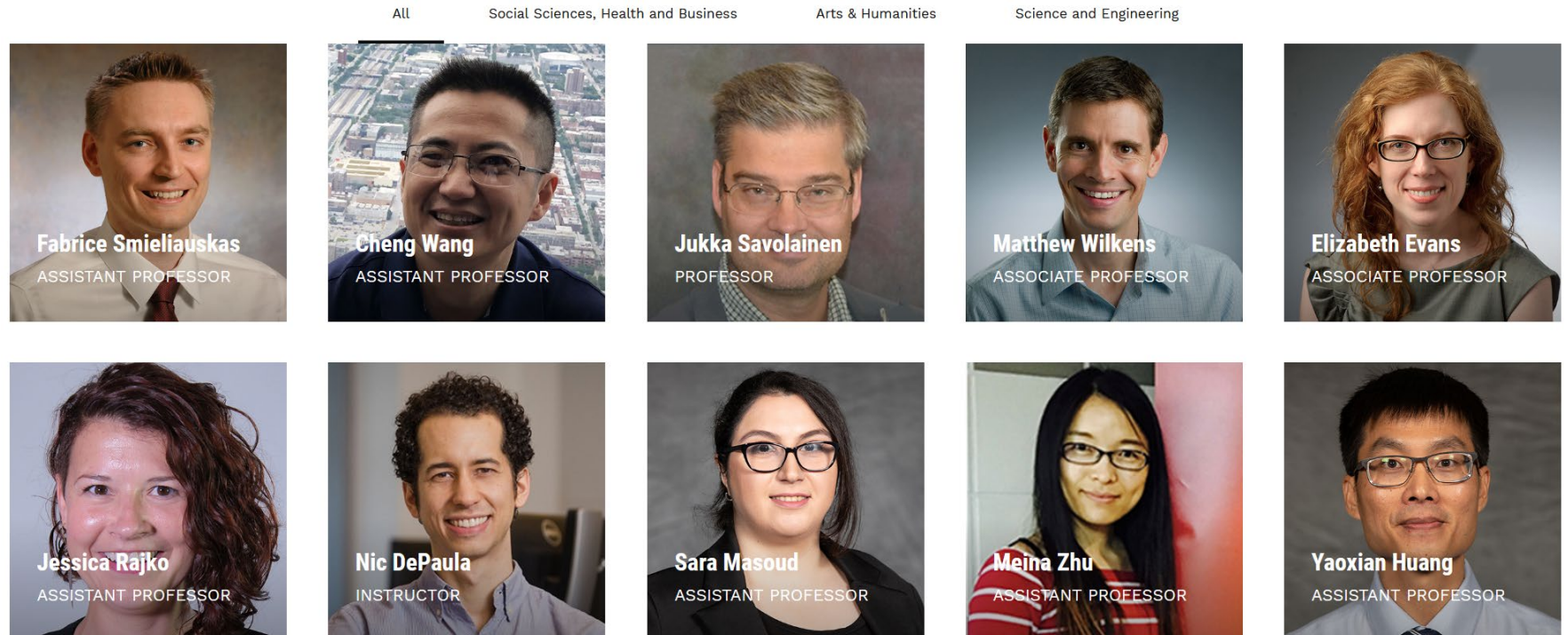| P.I.	P.I. Affiliation	Co-P.I.s	Co-P.I. Dept. / College	Title
Yanchao Liu	Industrial & Systems Engineering, **Engineering**	Ratna Babu Chinnam Daniel Grosu Michael Belzer Stephen Remias Carolyn Loh Dimitar Filev Tom Bruff Erika Linenfelser Jesse Holzer	Industrial & Systems Engineering Computer Science, Engineering Economics, College of Liberal Arts & Science Civil and Environmental Engineering Urban Studies and Planning Ford Motor Company SEMCOG Planner, City of Detroit Pacific Northwest National Laboratory	Developing Data-Driven Decision Support Systems for Fostering Extreme-Scale **Smart Urban Mobility Networks** that Include Autonomous Vehicles
Amar Basu	Electrical & Computer Engineering, **Engineering**	Sreenivasa Chinni	School of Medicine	**Cancer Diagnostics by Liquid Biopsy** Enabled by High Speed Imaging Cytometry and Machine Learning
Leah Ketcheson	**College of Education**	Shiyong Lu Xiangmin Zhang Deborah Charbonneau	Dept. of Computer Science, Engineering School of Information Sciences School of Information Sciences	Leveraging Big Data to Investigate **Health Disparities among Children** with Autism Spectrum Disorders
Cheng Wang	Sociology, **CLAS**	Richard J. Smith Shawn P. McElmurry Paul E. Kilgore	School of Social Work Civil & Environmental Engineering Department of Pharmacy Practice	A Data Science Approach for Integrating Social Media, Population, and Administrative Data to **Reduce Health Disparities**

Big Data Interdisciplinary Faculty

- Call for interdisciplinary hiring proposals led to > 40 submissions
- The area that attracted the most interest was Big Data
- Three search committees: Social sciences, health and business; Arts and humanities; & Science and engineering.
- Received > 400 applications in total
- Selected 10 exceptionally strong candidates

Accomplished

All   Social Sciences, Health and Business   Arts & Humanities   Science and Engineering

Fabrice Smieliauskas
ASSISTANT PROFESSOR

Cheng Wang
ASSISTANT PROFESSOR

Jukka Savolainen
PROFESSOR

Matthew Wilkens
ASSOCIATE PROFESSOR

Elizabeth Evans
ASSOCIATE PROFESSOR

Jessica Rajko
ASSISTANT PROFESSOR

Nic DePaula
INSTRUCTOR

Sara Masoud
ASSISTANT PROFESSOR

Meina Zhu
ASSISTANT PROFESSOR

Yaoxian Huang
ASSISTANT PROFESSOR

AI, Big Data & Analytics Group Website

Accomplished

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On-Demand Web Based Access to Grid Computing

Example: Jupyter Notebooks for Python & R with GPUs

- Visit OnDemand [Website](#)
- Select Interactive Apps
- Specify Compute Requirements
- Launch
- Session Ready in Minutes
- Upload necessary code/data
- Compute away!

All Dealer Scatter Plot of GPNV vs SE with Data Limited to (1,99)% Quantiles

OnDemand Website: https://ondemand.grid.wayne.edu | Only Pre-Requisite: Grid Account | Link
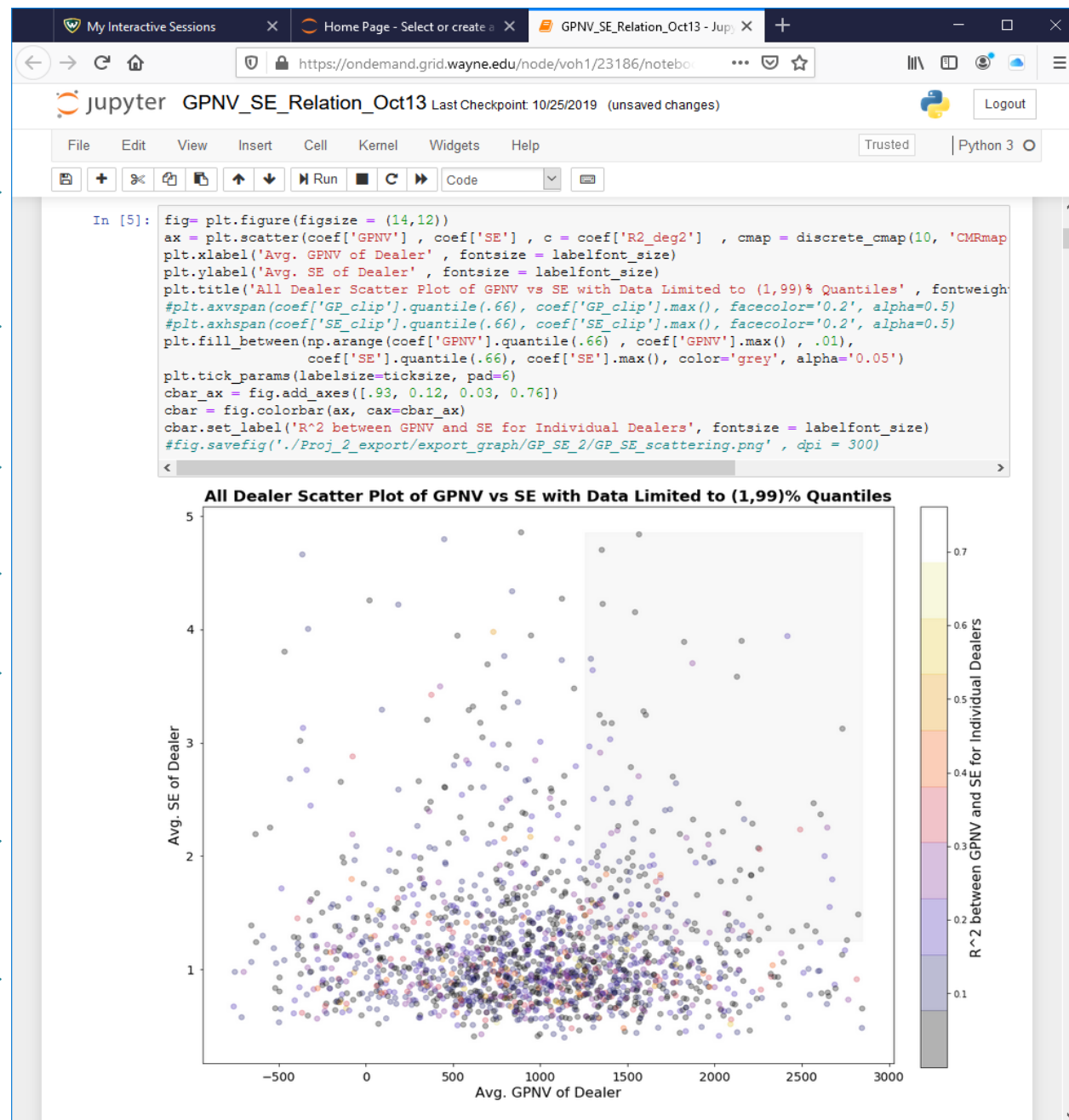
Action Plan

- Increase Research Synergies & Engagement
  - Monthly Brownbag Lunch Group Meetings and More
- Establish AI & Big Data Science Core Facility
  - Fund Critical Staff: Two Data Engineers, Faculty Time, GSAs, Program Manager / Administrative Assistant
- Education & Training Programs
  - Planning a menu of 1-credit courses on topics that will be of broad interest across the university
  - Planning Training Workshops (1 or 2 Days):
    - Data Science 101   Machine/Deep Learning
    - Visual Analytics   Advanced Analytics
    - Distributed Computing   Big Data Management
- Start Building Partnerships & Grow the Ecosystem
  - Private Sector / Government / Non-Profits / Others …
    - Membership, Investments …
  - Examples:
    - SOSCIP (Southern Ontario Smart Computing Innovation Platform)
    - IHBI - Central Michigan University (Primary Sponsor: Dow)
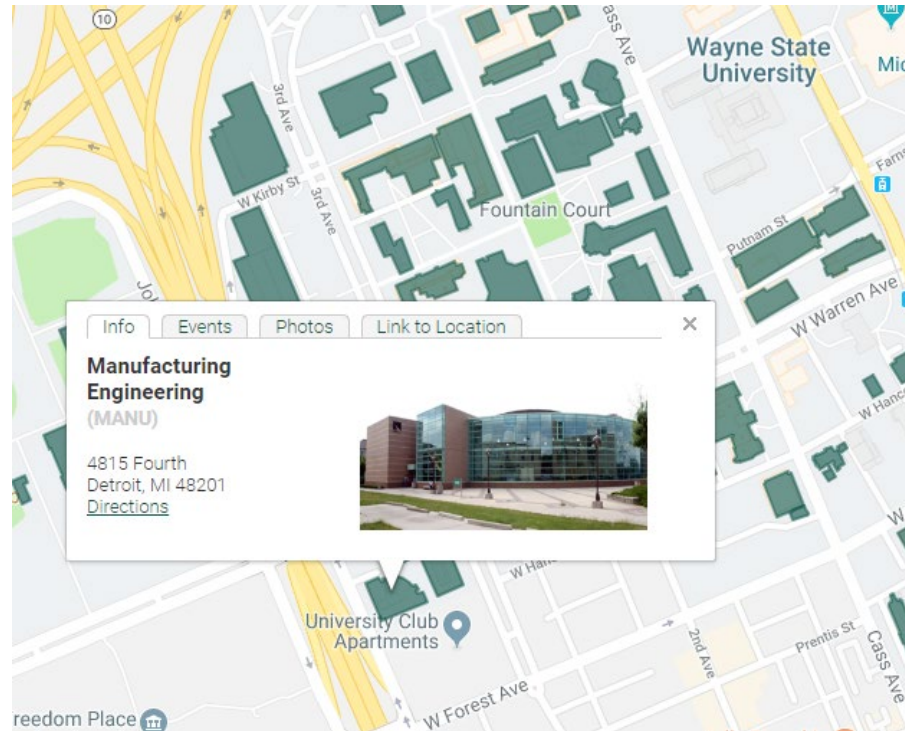
AI, Big Data & Analytics Lab

- Meeting Space
- Tutoring Space
- Student Research Workstations

Info | Events | Photos | Link to Location

Manufacturing Engineering (MANU)
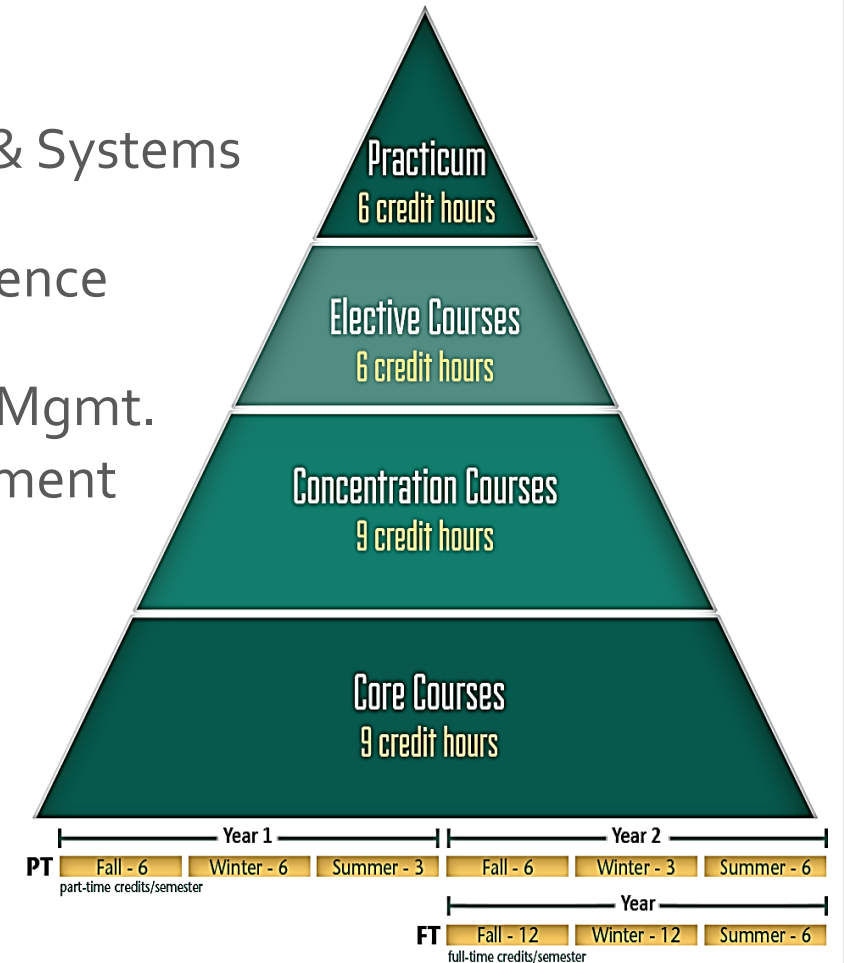
4815 Fourth
Detroit, MI 48201
Directions

- Volunteer Faculty & GSAs
- Conference Area for 6-8 People
- (7) Student Workstations
- Equipment for Online Meetings, Glass Dry Erase Boards

Data Science & Business Analytics MS Program

- **Colleges Housing Program:**
  - College of Engineering
  - Mike Ilitch School of Business
  - College of Liberal Arts & Sciences
- **Four Synergistic Tracks:**
  - **Advanced Analytics** – Industrial & Systems Engineering Department
  - **Data Computing** – Computer Science Department
  - **Data-Driven Business** – Inf. Sys. Mgmt.
  - **Statistics** – Mathematics Department
- **Inception Date**: Fall 2017
- **Applications To Date**: > 400
- **Enrollment**: ~90 Students
- **Coursework**:
  - Available to non-DSBA majors
- **Website**: engineering.wayne.edu/data-analytics/

Practicum
6 credit hours

Elective Courses
6 credit hours

Concentration Courses
9 credit hours

Core Courses
9 credit hours

	Year 1			Year 2		
PT	Fall - 6	Winter - 6	Summer - 3	Fall - 6	Winter - 3	Summer - 6

part-time credits/semester

	Year		
FT	Fall - 12	Winter - 12	Summer - 6

full-time credits/semester

- Teams of 4 to 6 students from across program tracks
- $10k / project: Immediate impact, Recruitment

MS DSBA Practicum Projects

PRACTICUM PROJECTS
PEAKER SERVICES, INC.

Novelty Detection and Autonomous Monitoring of Locomotives
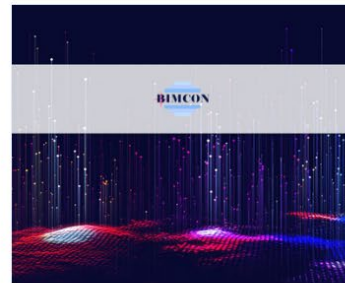
PRACTICUM PROJECTS
BIMCON, INC.

Vehicle Content Identification via Deep Learning Vision Technology

PRACTICUM PROJECTS
ATCO INDUSTRIES, INC.

Vision System for Automated Compliance Evaluation of Production Part Features

PRACTICUM PROJECTS
QUICKEN LOANS

Clickstream data analysis

PRACTICUM PROJECTS
WAYNE STATE UNIVERSITY – ENROLLMENT

Student Yield & Success

PRACTICUM PROJECTS
WAYNE STATE UNIVERSITY – ADMISSIONS

Student Momentum Pathway – Admissions to Success

PRACTICUM PROJECTS
SOFTURA

Analytics Aided Case Management

PRACTICUM PROJECTS
SIEMENS PLM

Sales Prediction Project

Planning Short & Modular Courses: 1-Credit

Examples

- Big Data Essentials: HDFS, MapReduce and Spark (see Coursera Example – Course 1)
- Big Data Integration & Processing (see UC San Diego Coursera Example – Course 3)
- Getting and Cleaning Data (see Johns Hopkins Coursera Example – Course 3)
- Introduction to Data Science in Python (see UoM Coursera Example – Course 1)
- Data Visualization in Python / R / Tableau (see UoM Coursera Example – Course 2; UC Davis Coursera Example – Several Courses)
- Business Intelligence Concepts, Tools, Applications (see U. of Colorado Coursera Example – Course 4)
- Applied Statistics with R (see UoM Coursera Example – Course 5)
- Applied Machine Learning in Python (see UoM Coursera Example – Course 3)
- Applied Machine Learning with Big Data (see UC San Diego Coursera Example – Course 4)
- Applied Deep Learning (see Coursera Examples by Andrew Ng)
- Applied Text Mining in Python (see UoM Coursera Example – Course 4)
- Applied Social Network Analysis in Python (see UoM Coursera Example – Course 5)
- Applied Graph Analytics for Big Data (see UC San Diego Coursera Example – Course 5)

Survey to be sent out soon!

Support for Other Units

Research Design & Analysis (RDA)

Biostatistics Core (BERD)

Statistical Consulting (MATH)

AI, Big Data & Analytics Core
(Big Data, AI / Machine Learning, Analytics, Training, Consulting)

Computing Infrastructure
Hardware, Software and System Staff
(C&IT and Colleges)

1st Big Data Brown Bag Lunch & Learn Meeting

December 5th, 11AM-1PM
Community Room at UGL

Thank you!

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http://bigdata.wayne.edu | bigdata@wayne.edu