

THE UNIVERSITY OF WISCONSIN-MILWAUKEE
College of Engineering and Applied Science

FACULTY MEETING

Friday, September 29, 2017 1:30 p.m. EMS E180

MINUTES

The meeting was called to order at 1:35 p.m. with Dean Brett Peters presiding. Fifty members were present:

EXCUSED: Professors Boyland, Ghorbanpoor, Goyal, Helwany, Mali, Pillai, Renken, Salowitz, Tabatabai, Venugopalan, Z. Yu

ABSENT: Professors Lopez

GUESTS: J. Martell, J. Opitz

I. ANNOUNCEMENTS

- A. Jean Opitz provided an update on the CEAS fundraising in the past year, and provided suggestions for faculty interested in contributing to the UWM Comprehensive Campaign.
- B. Jane Martell summarized the major changes in the UWM health benefits for 2018, reminding faculty who use Humana or United Healthcare that those companies will no longer be available. The Benefits Fair is on October 12, and the benefits manager will be in CEAS on Oct. 19 to answer questions.
- C. Prof. Misra announced that there will be an ABET workshop on October 6 at 1:00 PM. While it is targeted towards Biomedical Engineering, all faculty are welcome.
- D. Prof. Qu was welcomed into the Millionaire's Club.

II. INTRODUCTIONS

A. Faculty

- 1. Zhi Zheng, Assistant Professor, Biomedical Engineering

III. INFORMAL REPORTS – See Attachment 1

IV. AUTOMATIC CONSENT BUSINESS

- A. New Courses and Course Discontinuations – See Attachment 2

B. Materials Engineering Curriculum Changes – See Attachment 3

C. Electrical Engineering Curriculum Changes – See Attachment 4

V. NEW BUSINESS

A. Topic for Discussion – Smartphone Use on Exams

Associate Dean Munson led a discussion on smartphone use on exams, as well as general cheating. There was general agreement that guidelines on the use of smartphones as well as other forms of cheating on exams would be helpful, as well as a recommendation for misconduct sanctions for different forms of cheating. It was decided to send this issue to a committee to develop guidelines on the issue, and potentially a college policy.

B. CEAS Update from Dean Peters

Dean Peters provided a comprehensive update on a variety of issues. He reviewed the results of the evaluation of the dean and associate dean last year, summarized UWM's strategic directions and how CEAS fits in with those directions, and reviewed the US News and World Report graduate program metrics as well as the Carnegie criteria.

Associate Dean Nasiri discussed the progress on the creation of the Connected Systems Institute.

Dean Peters concluded with a review of the budget, including a decline in the CEAS marginal tuition and the FY2018 cut of \$865,000 for the CEAS budget.

Slides from the update can be found in Attachment 5

VI. GENERAL GOOD AND WELFARE – None

VII. ADJOURNMENT

Meeting Adjourned at 3:28 p.m.

John R. Reisel, Secretary
CEAS Faculty

JRR
Attachments

INFORMAL REPORTS

Office of Student Services – Todd Johnson

Here are some CEAS Fall 2017 (preliminary) enrollment highlights:

Undergraduate

New Freshmen	234	+ 13%
New Transfer	153	+12.5%
Total	1860	+ 4.9%

Graduate

New Masters	63	-13.7%
New Doctoral	29	+ 3.6%
Total	430	-2.5%

More detailed preliminary summaries for CEAS and the campus can be found on the following pages.

Career Services – Juli Pickering

No Report

Curriculum Committee – Prof. Church

No Report

Graduate Program Subcommittee –

No Report

Academic Planning Committee – Prof. Misra

APC met three times since last informal report and the following is a summary of the actions.

- APC received updates from Dean Peters on the SPC budget reductions as well as on the current spending status of instructional budget allocated to each program.
- Assistant Dean Klajbor presented a report on the status of research investments and its returns.
- APC received evaluation reports of CEAS administrators (Dean and Associate Deans) from the SSEA and reviewed them with Dean Peters. Committee asked Dean Peters to provide his plans to address the issues raised in those reports.
- APC continues discussions to formulate the process and metrics for assessment of academic programs and evaluation of departments.

Biomedical and Health Informatics – Prof. McRoy

No Report

Faculty Senate – Prof. Boyland

The Faculty Senate met after the Chancellor's Plenary Thursday September 28. In the announcements, Vice Provost Venugopalan explained that the raises in the new pay plan (2% in July 2018 and 2% again in January 2019) will both be based on information received by the Provost before January 15th, 2018. Accordingly, executive committees must arrange solid performer votes and merit votes to happen before then, that is, this semester if not previously. The merit can be based on multiple years since we've had no merit raises for many years.

In an exceptional business, the faculty senate passed a resolution authored by University Committee to request that if the Regents modify the composition of search-and-screen committee for chancellors, that any such

committee for Milwaukee include 1/3 regents, 1/3 faculty and 1/3 local stakeholders rather than being half regents.

In other business, the senate approved a proposal to extend to the drop deadline for classes to the 10th week (rather than the 8th week) of classes for normal semester-long classes.

We were also asked to make sure all faculty know that the Dean of Students has a large pot of money to help undergraduate students with emergency non-academic needs. Please refer any undergraduate students who report difficulties with transportation, housing or other non-academic problems.

University of Wisconsin--Milwaukee

Comparison of Enrollments to Date

Student Limits Set: CEAS
 Course Limits Set:

				Fall 2017							
				September 18, 2017							
				Prior Year To Date HC	Current Year To Date HC	Difference	% Difference	Prior Year Final HC	Ratio: Prior Year To Date / Final		
CEAS	UGRD	New Freshmen	Freshman	196	218	22	11.2%	196	100.0%		
			Sophomore	11	15	4	36.4%	11	100.0%		
			Junior		1	1					
			Total	207	234	27	13.0%	207	100.0%		
		Transfer Students	Freshman	6	11	5	83.3%	6	100.0%		
			Sophomore	63	55	-8	-12.7%	61	103.3%		
			Junior	35	51	16	45.7%	36	97.2%		
			Senior	32	36	4	12.5%	32	100.0%		
			Total	136	153	17	12.5%	135	100.7%		
		New Specials	Special	8	5	-3	-37.5%	8	100.0%		
			Total	8	5	-3	-37.5%	8	100.0%		
		Reentry Students	Freshman	4	3	-1	-25.0%	4	100.0%		
			Sophomore	4	7	3	75.0%	4	100.0%		
			Junior	6	4	-2	-33.3%	6	100.0%		
			Senior	14	16	2	14.3%	15	93.3%		
			Special		1	1					
			Total	28	31	3	10.7%	29	96.6%		
		Continuing Students	Freshman	22	18	-4	-18.2%	22	100.0%		
			Sophomore	284	286	2	0.7%	286	99.3%		
			Junior	301	341	40	13.3%	301	100.0%		
			Senior	786	792	6	0.8%	786	100.0%		
			Special	1		-1	-100.0%	1	100.0%		
			Total	1,394	1,437	43	3.1%	1,396	99.9%		
		Total				1,773	1,860	87	4.9%	1,775	99.9%
		GRAD	New Graduates	Master	73	63	-10	-13.7%	71	102.8%	
				Doctoral	28	29	1	3.6%	27	103.7%	
				Non Degree	11	8	-3	-27.3%	11	100.0%	
Total	112			100	-12	-10.7%	109	102.8%			
Reentry Students	Master		2	1	-1	-50.0%	2	100.0%			
	Doctoral		5	6	1	20.0%	5	100.0%			
	Non Degree			1	1						
	Total		7	8	1	14.3%	7	100.0%			
Continuing Students	Master		147	139	-8	-5.4%	148	99.3%			
	Doctoral		172	178	6	3.5%	173	99.4%			
	Non Degree		3	5	2	66.7%	3	100.0%			
	Total		322	322	0	0.0%	324	99.4%			
Total				441	430	-11	-2.5%	440	100.2%		
Total				2,214	2,290	76	3.4%	2,215	100.0%		
Total				2,214	2,290	76	3.4%	2,215	100.0%		

University of Wisconsin--Milwaukee

Comparison of Enrollments to Date

Student Limits Set:

Course Limits Set:

Fall 2017						
September 18, 2017						
	Prior Year To Date Credits	Current Year To Date Credits	Difference	% Difference	Prior Year Final Credits	Ratio: Prior Year To Date / Final Credits
GRAD		39	39			
GLBL	540	1,059	519	96.1%	537	100.6%
SW	9,850	9,020	-830	-8.4%	9,851	100.0%
SPH	1,013	1,087	74	7.3%	1,008	100.5%
NURS	11,311	11,442	131	1.2%	12,728	88.9%
L&S	154,144	150,310	-3,834	-2.5%	154,072	100.0%
SOIS	6,467	7,165	698	10.8%	6,459	100.1%
CHS	19,561	18,181	-1,380	-7.1%	19,635	99.6%
SFS	282	388	106	37.6%	280	100.7%
CEAS	19,892	20,001	109	0.5%	19,853	100.2%
SOE	17,258	17,222	-36	-0.2%	17,279	99.9%
LSB	36,023	35,741	-282	-0.8%	35,965	100.2%
PSOA	23,197	23,916	719	3.1%	23,238	99.8%
SARUP	6,023	6,118	95	1.6%	6,031	99.9%
Total	305,561	301,689	-3,872	-1.3%	306,936	99.6%

University of Wisconsin--Milwaukee

Comparison of Enrollments to Date

Student Limits Set:
Course Limits Set:

			Fall 2017					
			September 18, 2017					
			Prior Year To Date HC	Current Year To Date HC	Difference	% Difference	Prior Year Final HC	Ratio: Prior Year To Date / Final
Total			25,843	25,236	-607	-2.3%	26,037	99.3%
UGRD	New Freshmen	Freshman	3,041	3,147	106	3.5%	3,038	100.1%
		Sophomore	65	72	7	10.8%	64	101.6%
		Junior	1	3	2	200.0%	2	50.0%
		Special		1	1			
		Total	3,107	3,223	116	3.7%	3,104	100.1%
	Transfer Students	Freshman	264	234	-30	-11.4%	260	101.5%
		Sophomore	670	593	-77	-11.5%	669	100.1%
		Junior	425	435	10	2.4%	430	98.8%
		Senior	144	137	-7	-4.9%	146	98.6%
		Special	1	1	0	0.0%	1	100.0%
		Total	1,504	1,400	-104	-6.9%	1,506	99.9%
	New Specials	Senior		1	1			
		Special	348	326	-22	-6.3%	352	98.9%
		Total	348	327	-21	-6.0%	352	98.9%
	Reentry Students	Freshman	74	76	2	2.7%	74	100.0%
		Sophomore	162	174	12	7.4%	161	100.6%
		Junior	145	126	-19	-13.1%	146	99.3%
		Senior	174	191	17	9.8%	177	98.3%
		Special	149	150	1	0.7%	153	97.4%
		Total	704	717	13	1.8%	711	99.0%
	Continuing Students	Freshman	736	621	-115	-15.6%	732	100.5%
		Sophomore	3,944	3,709	-235	-6.0%	3,939	100.1%
		Junior	3,804	3,884	80	2.1%	3,808	99.9%
		Senior	6,359	6,038	-321	-5.0%	6,378	99.7%
		Special	711	680	-31	-4.4%	868	81.9%
		Total	15,554	14,932	-622	-4.0%	15,725	98.9%
	Total			21,217	20,599	-618	-2.9%	21,398
GRAD	New Graduates	Master	916	1,004	88	9.6%	917	99.9%
		Doctoral	172	158	-14	-8.1%	171	100.6%
		Non Degree	151	130	-21	-13.9%	151	100.0%
		Total	1,239	1,292	53	4.3%	1,239	100.0%
	Reentry Students	Master	44	42	-2	-4.5%	44	100.0%
		Specialist	10	15	5	50.0%	9	111.1%
		Doctoral	35	39	4	11.4%	35	100.0%
		Non Degree	25	16	-9	-36.0%	26	96.2%
		Total	114	112	-2	-1.8%	114	100.0%
	Continuing Students	Master	1,910	1,903	-7	-0.4%	1,917	99.6%
		Specialist	11	15	4	36.4%	11	100.0%
		Doctoral	1,203	1,173	-30	-2.5%	1,212	99.3%
		Non Degree	149	142	-7	-4.7%	146	102.1%

University of Wisconsin--Milwaukee

Comparison of Enrollments to Date

Student Limits Set:
 Course Limits Set:

		Fall 2017						
		September 18, 2017						
		Prior Year To Date HC	Current Year To Date HC	Difference	% Difference	Prior Year Final HC	Ratio: Prior Year To Date / Final	
	Total	3,273	3,233	-40	-1.2%	3,286	99.6%	
	Total	4,626	4,637	11	0.2%	4,639	99.7%	

NEW COURSES

- COMPSCI 202 INTRODUCTORY PROGRAMMING USING PYTHON, 3 cr., U
Programming in Python. Basic control structures including recursion. Basic and library data types. Problem solving with objects. Writing classes. Basic software development skills.
Pre-req: Math Placement Level B
- IND ENG 598 CONNECTED ENTERPRISE SYSTEMS, 3 cr., U/G
A multidisciplinary course that will expose students to new technologies that enable smart manufacturing, such as Internet of Things, Sensor Embedded Technologies, Big Data and Predictive Analytics.
Prereq: Jr st; Ind Eng 360, Ind Eng 367
- MECHENG 495 BIOMEDICAL INSTRUMENTATION LABORATORY, 3 cr., U
Characteristics of measurement systems, experiment planning, sensor and system calibration, measurement of basic quantities, first and second order systems, data acquisition and processing, experimental projects. Jointly offered with & counts as repeat of BME 495.
Prereq: BME 325 (P), MechEng 469 (C)

COURSE CHANGES

- BME 495 BIOMEDICAL INSTRUMENTATION LABORATORY, 3 cr., U
Characteristics of measurement systems, experiment planning, sensor and system calibration, measurement of basic quantities, first and second order systems, data acquisition and processing, experimental projects. Jointly offered with & counts as repeat of MechEng 495.
Prereq: BME 325 (P), MechEng 469 (C)

had been

- BME 495 BIOMEDICAL INSTRUMENTATION LABORATORY, 3 cr., U
Characteristics of measurement systems, experiment planning, sensor and system calibration, measurement of basic quantities, first and second order systems, data acquisition and processing, experimental projects. Prereq: BioSci 203(P), BME 101(P), ElecEng 310(P), ElecEng 436(P), MechEng 469(C).

- COMPSCI 458 COMPUTER ARCHITECTURE, 3 cr., U/G
Processor organization and design; memory organization; microprogramming and control unit design; I-O organization; case studies of selected machine architectures. Jointly offered with & counts as repeat of ElecEng 458.
Prereq: jr st; ElecEng 354(P), C or better in CompSci 315(P) or ElecEng 367(P).

had been

- COMPSCI 458 COMPUTER ARCHITECTURE, 3 cr., U/G
Processor organization and design; memory organization; microprogramming and control unit design; I-O organization; case studies of selected machine architectures. Jointly offered with & counts as repeat of ElecEng 458.
Prereq: jr st; ElecEng 354(P), CompSci 315(215)(P) or ElecEng 367(P).
- COMPSCI 481 SERVER-SIDE INTERNET PROGRAMMING, 3 cr., U/G
Introduces students to the concept of server-side programming and web applications development. Topics include dynamic web site development, session management, security, and relational databases.
Prereq: jr st; one of CompSci 113 (P), InfoSt 320 (P), or Art 324 (P); C or better in CompSci 202(P) or CompSt 702(P)
- had been
- COMPSCI 481 SERVER-SIDE INTERNET PROGRAMMING, 3 cr., U/G
Introduces students to the concept of server-side programming and web applications development. Topics include dynamic web site development, session management, security, and relational databases.
Prereq: jr st; one of CompSci 113(C), InfoSt 240(C), Art 324(C), or CompSt 702(P).
- ELECENG 458 COMPUTER ARCHITECTURE, 3 cr., U/G
Processor organization and design; memory organization; microprogramming and control unit design; I-O organization; case studies of selected machine architectures. Jointly offered with & counts as repeat of CompSci 458.
Prereq: jr st; ElecEng 354(P); C or better in CompSci 315(P) or ElecEng 367(P).
- had been
- ELECENG 458 COMPUTER ARCHITECTURE, 3 cr., U/G
Processor organization and design; memory organization; microprogramming and control unit design; I-O organization; case studies of selected machine architectures. Jointly offered with & counts as repeat of CompSci 458.
Prereq: jr st; ElecEng 354(P), CompSci 315(215)(P) or ElecEng 367(P).

MATERIALS ENGINEERING CURRICULUM CHANGES

- 1) Allow MathSci 234 to be used as a substitute of ElecEng 234.
- 2) Allow CompSci 151, CompSci 153, CompSci 202, and CompSci 250 to be used as a substitute for CompSci 240.

ELECTRICAL ENGINEERING CURRICULUM CHANGES

- 1) Add CompSci 241 as a required course for Electrical Engineering majors.
- 2) Remove MechEng 301 as a required course and add MechEng 301 to the list of Group A Technical Electives for Electrical Engineering majors.

CEAS UPDATE

The slides from Dean Peters' and Associate Dean Nasiri's presentations can be found on the following pages.

Faculty and Staff Meeting

September 2017



Promotions – Congratulations!

Professor

- Nikolai Kouklin, EE
- Troy Liu, CEE
- Krishna Pillai, ME

Associate Professor with tenure

- WooJin Chang, ME

UWM Strategic Directions

Student Success

Research Excellence

Community Engagement

amidst
S h i f t i n g C o n t e x t

College Strategic Goals

1. Make CEAS an outstanding environment in which to learn and to work
2. Create a dynamic environment and infrastructure to enhance innovative research
3. Anticipate and respond to market demands in order to produce graduates who are prepared to address and adapt to the changing needs of the marketplace and society
4. Build partnerships with stakeholders and enhance awareness of CEAS strengths and accomplishments

Academic Plan

Research Leads the Way

- Research growth and enhancement is the path to fulfilling the strategic goal of being top 100 College of Engineering
- Grow externally funded research
- Grow visible, well-regarded, impactful research
- Grow prestigious, scholarly publications
- Enhance visibility of our faculty
- Grow and enhance PhD program

Academic Plan

Education is our Foundation

- Attract, retain, and graduate increasing numbers of well prepared students
- Create compelling new options, specializations, degrees
- Engage the students in meaningful activities
 - Undergraduate research (including freshmen), engineering design, innovation and entrepreneurship
- Enhance student organizations and other extra-curricular activities
- Help with transition to upper level
 - Living learning communities
 - Study groups; peer mentoring; *student success center*
 - Involvement with departments, faculty, and upper class students
- *Early warning signs* → connect with advisors

Goals and Metrics

Research: Externally funded expenditures, Scholarly publications, Visible centers

Students: Number of graduates/year, Graduation rate, Placement rate

Faculty: Size, Editors, Fellows, Chairs, NAE

Fund raising: Chairs, Fellowships, Scholarships, Capital



College of Engineering & Applied Science

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Goals: Progress to Targets

Area	2012	2016	2017	Target
Ext. Research Expenditures	\$7.1M	\$4.5M	\$4.6M	\$25M
T/Tr Faculty Size	70	72	71	100
PhD Enrollment	185	205	213	350
MS Enrollment	187	222	217	500
BS Enrollment	1541	1773	1860	1850
BS Graduates	238	327	339	370
Student Credit Hours	32.1K	41.2K	38.2K	↑
Gifts Received	\$0.34M	\$0.36M	\$0.48M	\$1.75M
Ranking (USNWR)	131	118	116	99



College of Engineering & Applied Science

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US News and World Report College Graduate Rankings

<i>Factor (weight)</i>	<i>Our Rank</i>
<ul style="list-style-type: none"> Quality assessment (40%) <ul style="list-style-type: none"> Peer assessment (25%) Recruiter (15%) 	103 (tie) 104 (tie)
<ul style="list-style-type: none"> Student selectivity (10%) <ul style="list-style-type: none"> Mean GRE quantitative (6.75%) Acceptance rate (3.25%) 	121 121
<ul style="list-style-type: none"> Faculty resources (25%) <ul style="list-style-type: none"> Student to faculty ratios <ul style="list-style-type: none"> Full-time PhD students/FTE (7.5%) Full-time MS students/FTE (3.75%) % of faculty in NAE (7.5%) PhDs awarded (6.25%) 	n/a n/a 96 (tie) 107
<ul style="list-style-type: none"> Research activity (25%) <ul style="list-style-type: none"> Research expenditures (15%) Research expenditures/FTE (10%) 	141 144



College of Engineering & Applied Science

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Carnegie Criteria 2016

Numeric Rank on Seven Metrics

- Institutional data reported annually (Used only 2014 data)

Funding related

- STEM research expenditures (0.900)**
- Non-STEM research expenditures (0.791)
- Non-faculty doctoral researchers (post-docs and scientists) (0.902)**

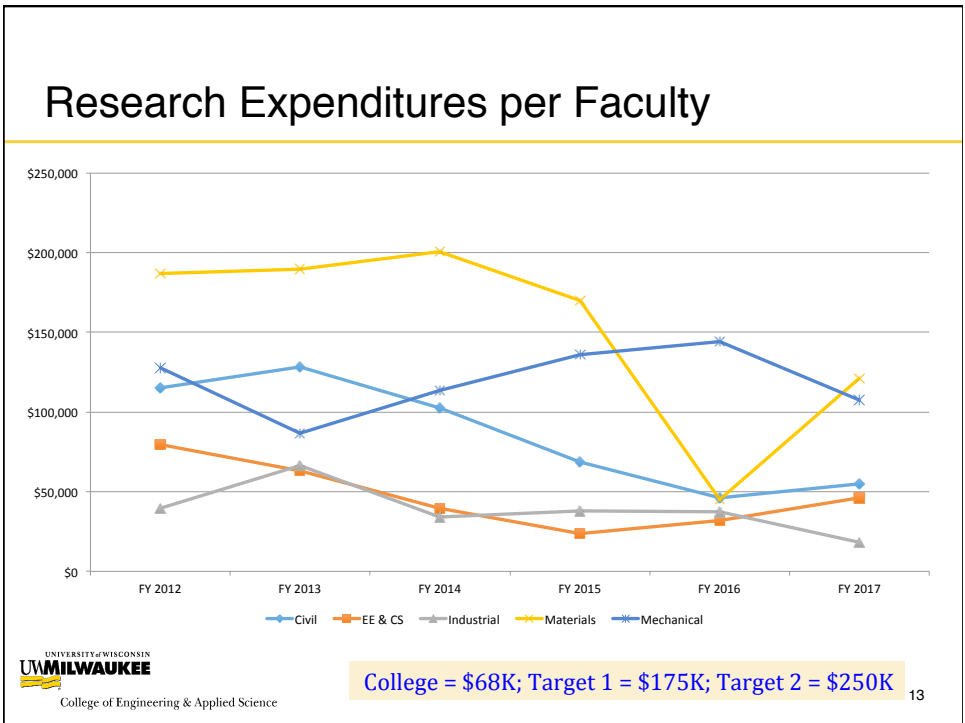
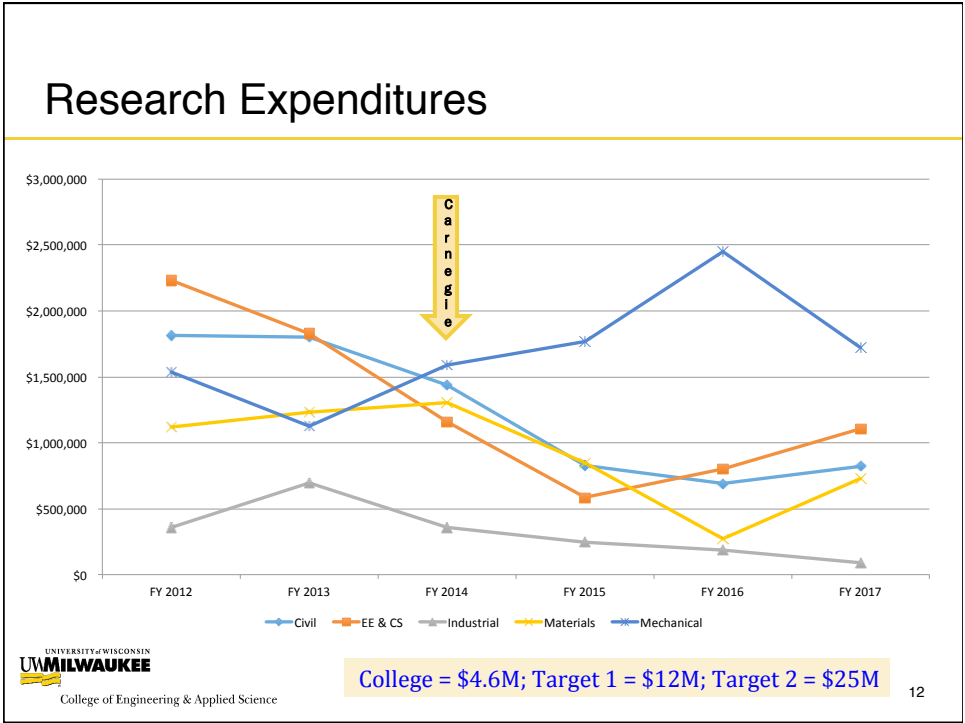
PhDs awarded

- Number of PhDs in STEM fields (0.914)**
- Number of PhDs in Humanities (0.919)
- Number of PhDs in Social Sciences (0.873)
- Number of PhDs in other fields (0.616)

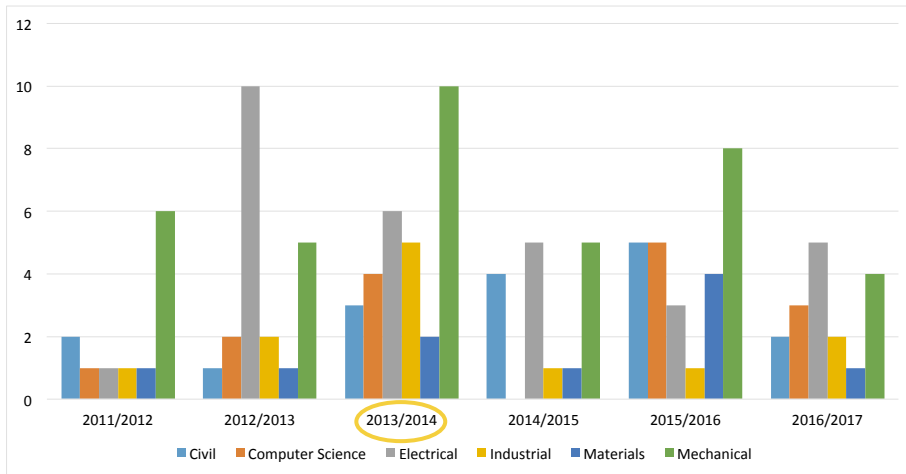


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PhD Degrees Awarded



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College = 26; Target = 70

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Research

Key research centers/institutes in theme areas

- CAMC*, CSI*, GRAPES, IPIT, WEP

Help each faculty member reach next level of activity

- Semi-formal grouping of faculty to research theme areas
- Series of mini-symposiums to explore collaborative opportunities

Strengthen partnerships

- Internal to UWM, External universities, and Industry
- Build on key successes: existing centers, strong connections to federal agencies, ongoing collaborations

Track scholarly publication activity and impact as measures of research productivity (see *CEAS Research Report*)



College of Engineering & Applied Science

FY17 Awards = \$6.3M (71 projects)

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Establishing Connected Systems Institute

Adel Nasiri
University of Wisconsin-Milwaukee

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Vision for the Connected Systems Institute

- To establish an internationally recognized, multidisciplinary Institute on connected systems in collaboration with industry leaders and academia.
- UWM is uniquely positioned to establish the CSI.
- The Institute will benefit the participating members in conducting advanced research, training talents, and connecting member companies.

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Mission for CSI

- To coordinate and facilitate **scholarship and educational** activities.
- To conduct **applied research** promoting greater efficiency, responsiveness, reliability, security, and agility.
- To establish **unique state-of-the-art IIoT simulation/emulation/testbed/test plant facilities** covering end-to-end from suppliers to customers.
- To train **highly skilled workforce**.

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CSI Initial Focus

- **IIoT within factories and plants**
- **Asset management**
- **Connectivity for product life cycle**
- Infrastructure
- Virtual and augmented reality
- Transportation and connected vehicles
- Connected health systems

All elements includes data science, network, visualization, and cybersecurity.

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CSI Research Focus

Specific Industry: Manufacturing; Water; Oil & gas; Life sciences; Packaged food and beverage; Smart cities and infrastructure; Grid interface, energy efficiency, and smart grid.

Business Platform: Business Intelligence (BI); e-Commerce; Supply chain management; Advanced manufacturing; Organization design and culture to support integrated systems.

Networks & Control: Monitoring and controls; data science, Big data; Cybersecurity; Computing and computer science.

Devices & Hardware: Hardware for connectivity; Embedded systems, Hardware in the loop.

Basic Research: Advanced and real time sensors for IoT; Computational studies; Security algorithms and mechanisms.

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CSI Educational Components

- Undergraduate and Graduate Students
- Joint Professional MS Degree between CEAS and LSB
- Management and Executive Education
- Professional Development
- Certificates, undergraduate and graduate

Connected Systems Institute Courses					
<ul style="list-style-type: none"> • Introduction To Connected Systems CEAS • Connected Systems for Business LSB 	<ul style="list-style-type: none"> • Automation for Industrial Systems CEAS 	<ul style="list-style-type: none"> • Business Intelligence for Connected Systems; Organizational Design LSB • E-Commerce and Advanced BI customer Relationships LSB 	<ul style="list-style-type: none"> • Big Data and Data Analytics CEAS • Data Analytics, Visualization and Management LSB • Artificial Intelligence and machine Learning CEAS 	<ul style="list-style-type: none"> • Cyber security for Connected Systems SIS • Adaptive controls in Connected Systems CEAS • Data and Sensor Networks in Connected Systems CEAS 	<ul style="list-style-type: none"> • Standards, Quality, and Validation CEAS • Advanced Supply Chain Optimization LSB

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Potential Corporate Partners

- ANSYS
- A.O. Smith Corp.
- Ariens
- Badger Meter
- Brady Corp.
- Briggs & Stratton
- BRP
- CISCO
- DRS Technologies
- Eaton
- Fanuc
- GE Healthcare
- Generac
- Harley Davidson
- HUSCO Int
- IBM
- InSinkErator
- Johnson Controls (both divisions)
- Master Lock Co.
- Microsoft
- Milwaukee Tools
- Oshkosh Corporation
- Plexus Corporation
- Regal-Beloit Corp.
- Rexnord
- Rockwell Automation
- Sargento Foods
- Snap-on Tools Inc.
- SPX Transformer Solutions
- We Energies

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Progress Till Date

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CSI Facilities

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UWMILWAUKEE

Timeline for Tasks and Milestones

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UWM Related Centers and Entities

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- Institute for Physical Infrastructure and Transportation
- Decision System and Artificial Intelligence Lab (DSAIL)
- Supply Chain Management Institute
- Center for Advanced Embedded Systems
- Center for Technology Innovation
- Lubar Entrepreneurship Center
- Center on Water Equipment and Policy
- Bostrom Center for Business Competitiveness, Innovation, and Entrepreneurship
- Center for Information Policy Research (CIPR).
- CARGI- Center for Advanced Research on Gas Industry
- DOE Industry Assessment Center

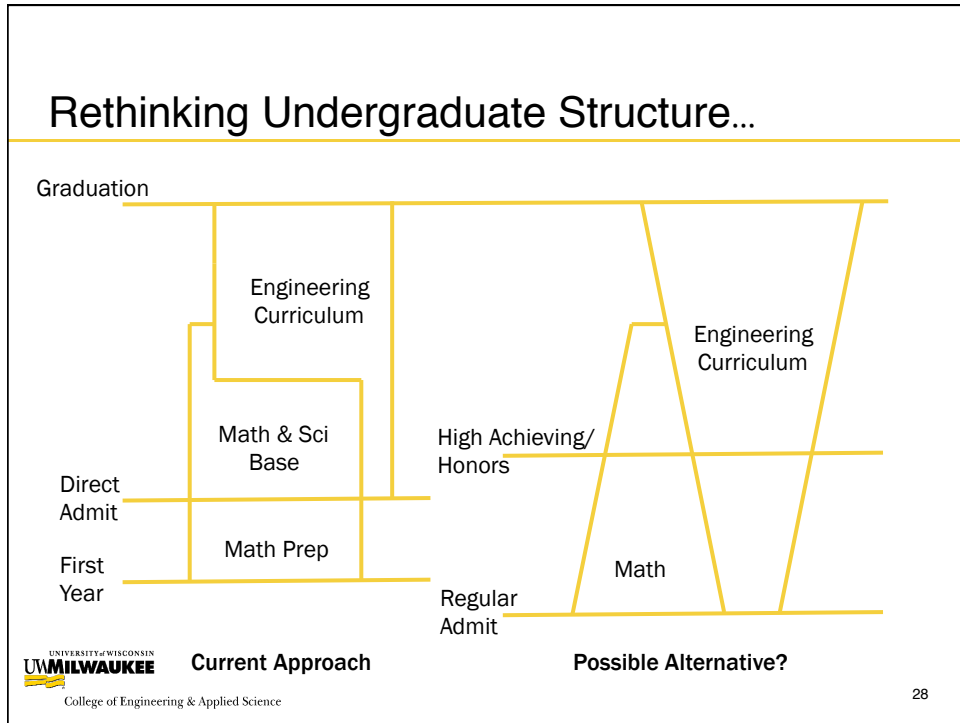
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Undergraduate Recruiting

Three categories

- High-achieving students
 - Scholarships, research, scholars-program activities
 - Same criteria - 3.5 GPA, 25 ACT, 28 ACT-Math
- Direct admit to major
 - Expand pool of students with potential for success
 - Sliding scale from combination of GPA and ACT scores based on past student success data
- First-year engineering program
 - Structured curriculum with pre-defined milestones
 - Leverage meta-major concept to ensure students have pathway to success
 - Created Student Success Center to provide support

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Undergraduate Retention

Engage students in meaningful activities


- Freshmen LLC
- Student organizations
- Honors programming for top students
- Research experiences

Proactive advising to keep students on track

Each department developing focused initiatives to engage students

Financial Support

- 69 students (32%) with EFC < \$6,000
- 25 graduated (36%) compared to 50% graduate rate for others



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Professional Masters Programs

Opportunity to build industry relationships, engage practicing engineers, and/or provide pathway to career

- Computer Science program approved
- Information Systems Technology program approved (joint with SOIS)
- Engineering Management program under development
- Energy program, in collaboration with Johnson Controls, under development
- Numerous other opportunities exist

Exploring alternative approaches to aid development

- Keypath – 3rd party company with revenue sharing model
- UW Extension – services for development and online support

Academic Partnerships

Collaborative programs with other two-year, four-year, and international partners

- Pathway to engineering from associate's degree
- 1 to 2 semester visiting students (ug and grad)
- 2+2 dual degree programs (in same major)
- 3+2 dual degree programs (in different major)
- 1+1 masters dual degree programs

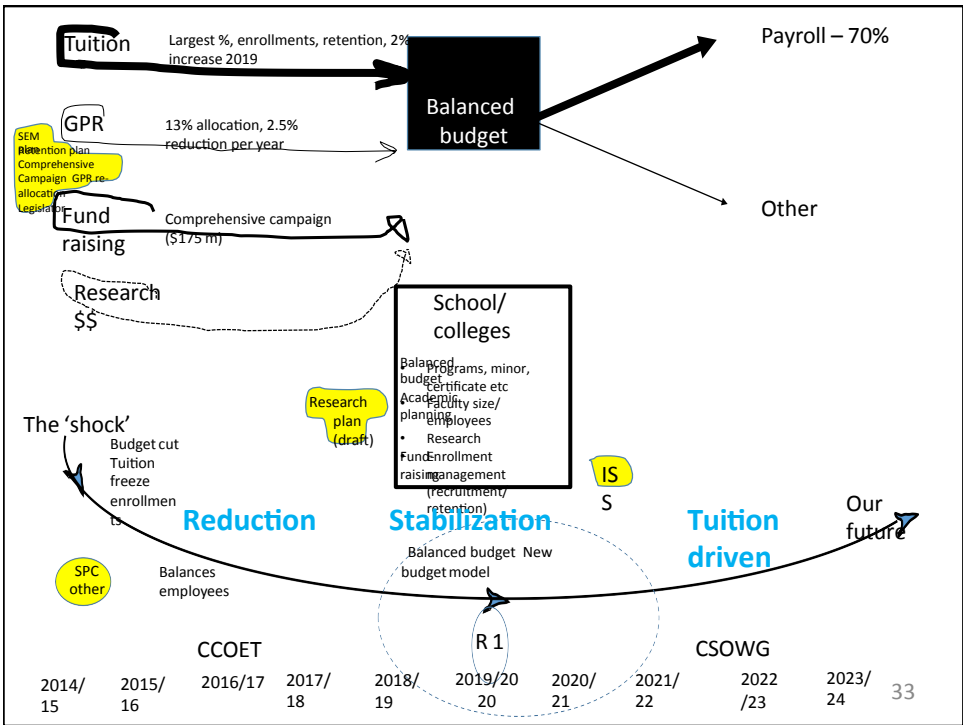
15 WI Schools & 16 International

Budget and Impact



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UWM FINANCIAL POSITION

UWM Financial Projections – Three Scenarios												
	No SEM				Partial SEM				Full SEM			
	FY 17	FY 19	FY 21	FY 23	FY 17	FY 19	FY 21	FY 23	FY 17	FY 19	FY 21	FY 23
Student Headcount	26,037	24,144	23,282	22,910	26,037	24,469	24,207	24,328	26,037	24,979	24,954	25,053
Total Revenues	\$512	\$488	\$479	\$478	\$512	\$495	\$495	\$503	\$512	\$500	\$508	\$518
Tuition	\$217	\$207	\$208	\$213	\$217	\$212	\$219	\$230	\$217	\$215	\$228	\$241
State GPR	\$127	\$121	\$115	\$109	\$127	\$121	\$115	\$109	\$127	\$121	\$115	\$109
Total Employees	3,120	2,929	2,751	2,701	3,120	3,012	2,885	2,885	3,120	3,056	3,031	3,031
Faculty	747	700	659	647	747	721	694	694	747	737	731	726
Student/Faculty	29	28	29	29	29	28	29	29	29	28	28	28
Total Expenses	\$521	\$496	\$482	\$480	\$521	\$505	\$498	\$501	\$520	\$510	\$511	\$515
Salaries	\$245	\$230	\$216	\$216	\$245	\$237	\$228	\$228	\$245	\$240	\$238	\$238
Net Operating Loss/Gain	(\$9)	(\$8)	(\$3)	(\$1)	(\$9)	(10)	(\$3)	\$2	(\$9)	(\$10)	(\$4)	\$0
Tuition/Other Funds Balances	\$42	\$32	\$21	\$15	\$42	\$28	\$8	\$20	\$42	\$27	\$12	\$14

*All \$\$ refer to millions.

CEAS PRIOR BUDGET CUTS VS. FUNDING

Category	2017	2016	2015	2014	2013	2012	2011	2010
101 Budget	\$ 13,491,364	\$ 13,920,012	\$ 12,371,776	\$ 12,163,436	\$ 11,482,149	\$ 11,037,887	\$ 10,297,081	\$ 8,461,096
131 UWM TA Funds	\$ 786,913	\$ 786,913	\$ 786,913	\$ 776,891	\$ 776,891	\$ 650,840	\$ 650,840	\$ 662,561
Marginal Tuition	\$ (309,503)	\$ 449,956	\$ 1,518,870	\$ 635,499	\$ 522,641	\$ 593,069	\$ 413,237	\$ 367,159
Budget Cuts	\$ (1,174,000)	\$ (750,000)	\$ (345,000)	\$ (264,000)	\$ (236,641)	\$ (215,300)	\$ (72,790)	\$ (116,126)

SPC EXPENDITURE TARGET – CEAS FY17

- CEAS FY17 “REDUCTION” WAS \$368,647
- HOW WAS THAT CALCULATED
 - \$174,127 OR 1% OF FY17 TOTAL UNIT FORECASTED EXPENSES
 - \$194,647 OR 50% OF PROJECTED FY17 VACANCY RATE
- CEAS ACHIEVED THIS IN FY17

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SPC EXPENDITURE TARGET – CEAS FY18

FY 18 NUMBERS

- UWM IS GOING TO TAKE \$1.65 MILLION FROM CEAS CARRY FORWARD RESERVE
- SPENDING CAP IS \$16.3 MILLION FOR FY18
 - PROJECTED REVENUES OF \$17.165M
 - CAN SEE THIS AS A CUT OF \$865,000

CONSEQUENCE FOR CEAS

- BUDGET DOESN'T MATTER (TO AN EXTENT)
 - EXPENDITURES ARE WHAT MATTERS
- EVERYTHING IS A TRADE OFF
 - TUITION DIFFERENTIAL FUNDS VS. 101
 - 150 FUNDS VS 101 FUNDS
 - 136 REPAIRS TO ITEMS VS TA SALARIES
 - CGSA VS. DEPT. S&E
 - FACULTY BUYOUT HISTORY (101³⁷ FUNDS, 150 FUNDS)

TA/AD-HOC ALLOCATIONS

Dept.	FY18 Allocation	Per Semester (assuming 50% per semester)	Current Fall Commitments	Fall allocation remaining (over)
Civil	\$211,038	\$105,519	\$97,498	\$8,021
Comp Sci	\$247,302	\$123,651	\$138,528	(\$14,877)
Electrical	\$270,005	\$135,003	\$131,816	\$3,187
Industrial	\$216,571	\$108,286	\$122,260	(\$13,974)
Materials	\$126,266	\$63,133	\$53,668	\$9,465
Mechanical	\$325,868	\$162,934	\$128,711	\$9,223
Biomedical	N/A	N/A	N/A	

Fall 2017 Enrollment Status

Overall Headcount	+3.7%	Overall Credits	-0.5%
UG Headcount	+4.9%	Civil	-8.6%
Freshmen	+12.6%	CompSci	+3.5%
Transfer	+11.1%	Electrical	-0.4%
Grad Head Count	-1.2%	Industrial	-2.9%
		MatlEng	-2.6%
		Mechanical	-1.0%

Preliminary – as of 9/5/2017

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Key Considerations Going Forward

Tuition revenue is critical

- Comes from enrollment

Must recruit and retain more students

- Undergraduate
- Tuition paying masters

Must be more efficient

Other sources of revenue also matter, especially at the margin

- Research funding – both direct and indirect
- Donations and gifts
- Selective special projects

What is an appropriate department funding allocation model?



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Summary

Challenging external environment

Our growth remains good and our potential remains strong

- Several new initiatives in progress

Sustain momentum in research growth

- Good core activities to build on
- Focusing efforts at multiple scales

Continue to strive for new resources

- Self generated through enrollment growth
- New infusions derived from our value added
- Direct and indirect support through funded research
- Gifts in support of our mission



College of Engineering & Applied Science

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Connected Systems Institute (CSI)

Adel Nasiri

University of Wisconsin-Milwaukee

Vision for the Connected Systems Institute

- To establish an internationally recognized, multidisciplinary Institute on connected systems in collaboration with industry leaders and academia.
- UWM is uniquely positioned to establish the CSI.
- The Institute will benefit the participating members in conducting advanced research, training talents, and connecting member companies.

Mission for CSI

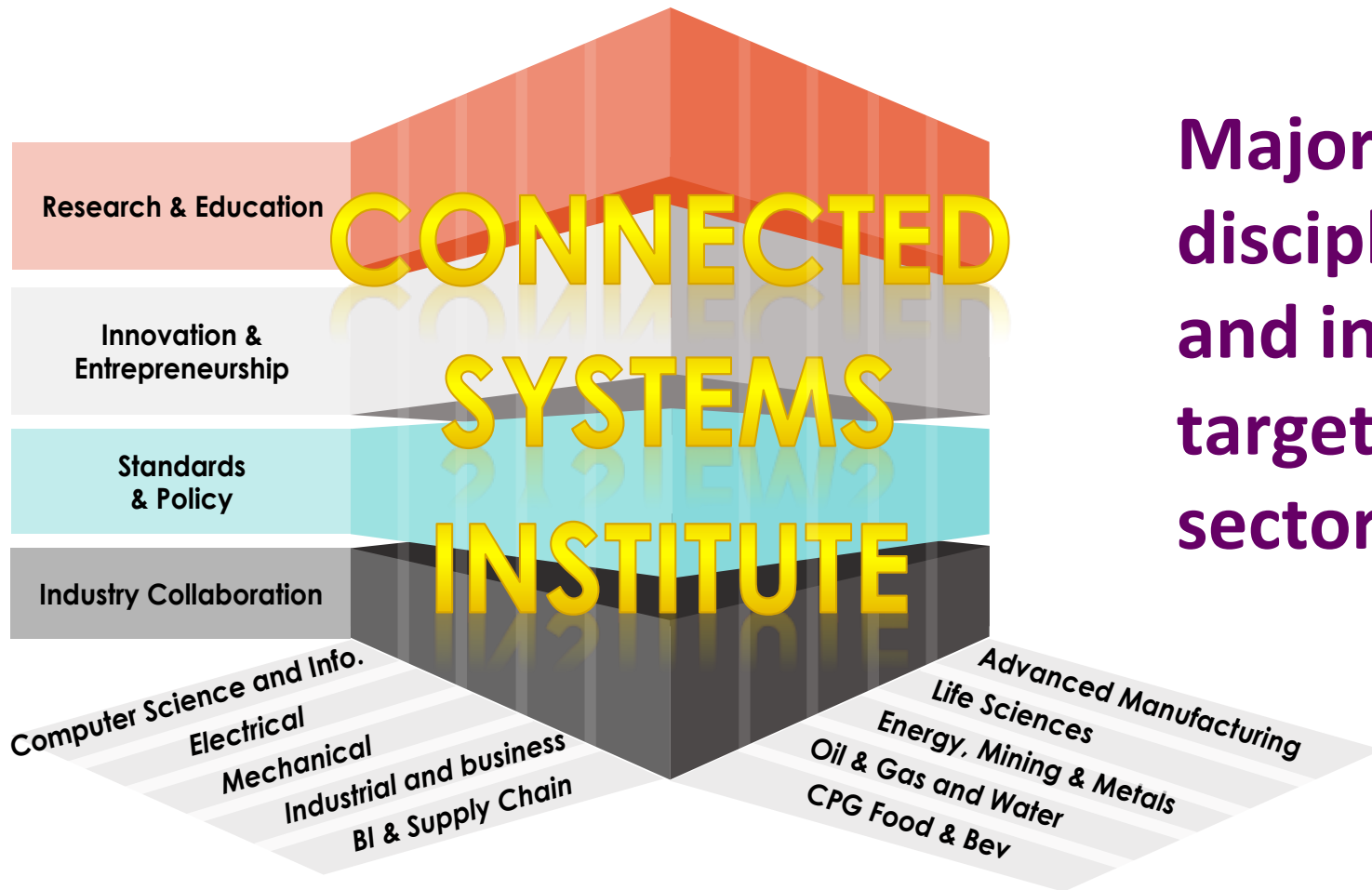
- To coordinate and facilitate **scholarship and educational** activities.
- To conduct **applied research** promoting greater efficiency, responsiveness, reliability, security, and agility.
- To establish **unique state-of-the-art IIoT simulation/emulation/testbed/test plant facilities** covering end-to-end from suppliers to customers.
- To train **highly skilled workforce**.

CSI Initial Focus

- **IloT within factories and plants**
- **Asset management**
- **Connectivity for product life cycle**
- Infrastructure
- Virtual and augmented reality
- Transportation and connected vehicles
- Connected health systems

All elements includes data science, network, visualization, and cybersecurity.

CSI Concept



Major tasks,
disciplines,
and initial
target
sectors

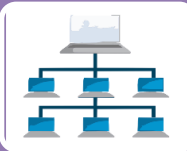
CSI Research Focus



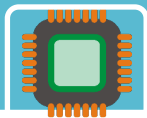
Specific Industry: Manufacturing; Water; Oil & gas; Life sciences; Packaged food and beverage; Smart cities and infrastructure; Grid interface, energy efficiency, and smart grid.



Business Platform: Business Intelligence (BI); e-Commerce; Supply chain management; Advanced manufacturing; Organization design and culture to support integrated systems.



Networks & Control: Monitoring and controls; data science, Big data; Cybersecurity; Computing and computer science.



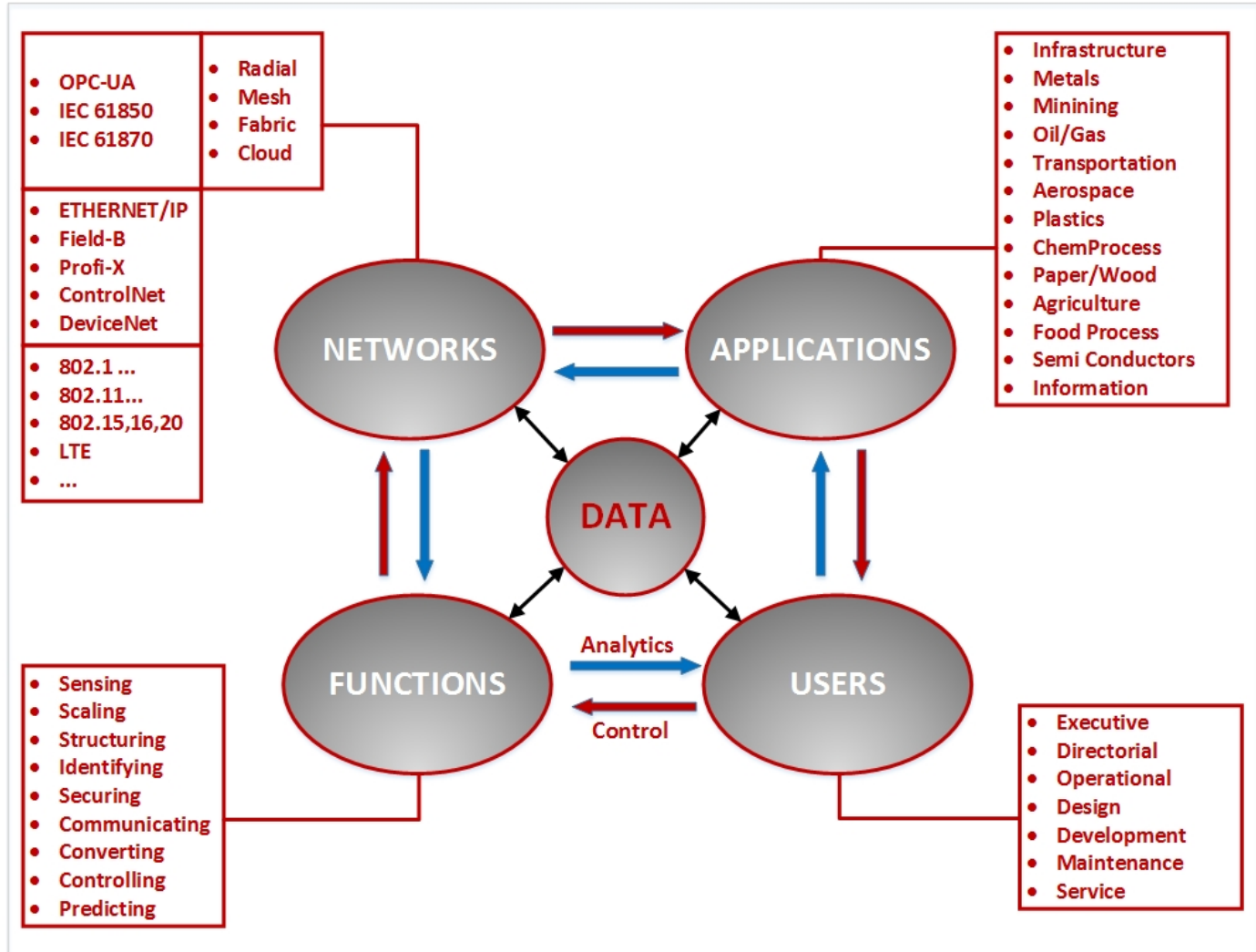
Devices & Hardware: Hardware for connectivity; Embedded systems, Hardware in the loop.



Basic Research: Advanced and real time sensors for IoT; Computational studies; Security algorithms and mechanisms.

CSI Architectural Research Platform

Data
to
Information
to
Knowledge
to
Decisions



CSI Educational Components

- Undergraduate and Graduate Students
- Joint Professional MS Degree between CEAS and LSB
- Management and Executive Education
- Professional Development
- Certificates, undergraduate and graduate

Connected Systems Institute Courses

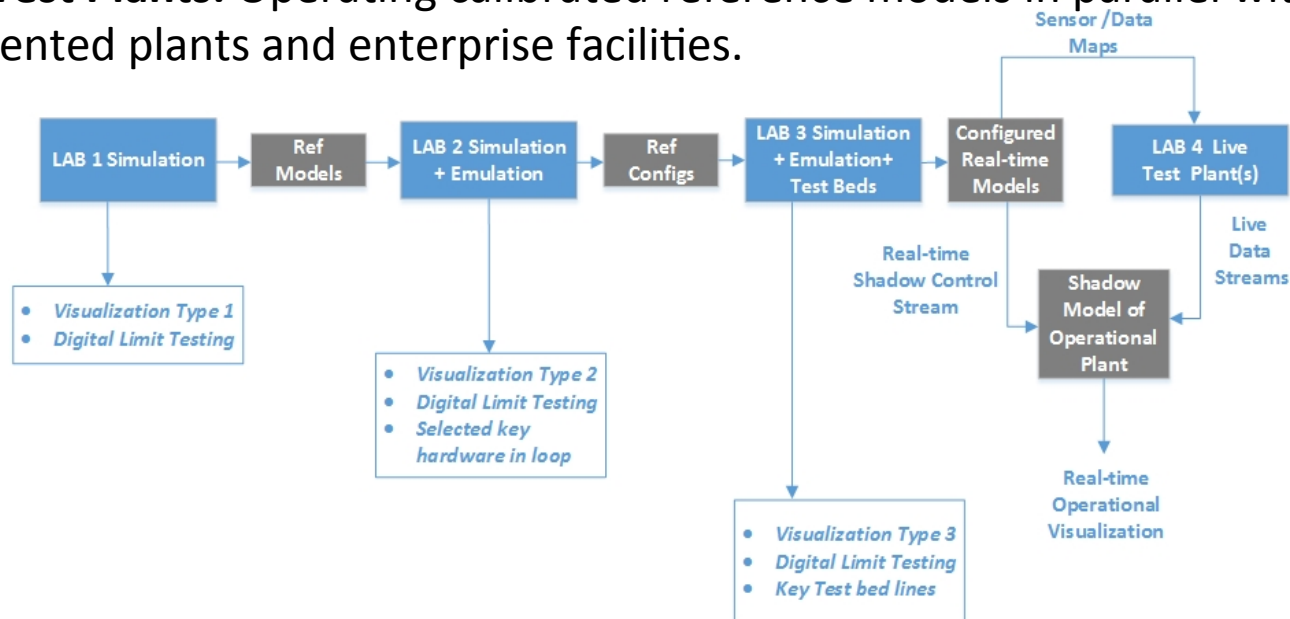
<ul style="list-style-type: none"> • Introduction To Connected Systems CEAS • Connected Systems for Business LSB 	<ul style="list-style-type: none"> • Automation for Industrial Systems CEAS 	<ul style="list-style-type: none"> • Business Intelligence for Connected Systems; Organizational Design LSB • E-Commerce and Advanced BI customer Relationships LSB 	<ul style="list-style-type: none"> • Big Data and Data Analytics CEAS • Data Analytics, Visualization and Management LSB • Artificial Intelligence and machine Learning CEAS 	<ul style="list-style-type: none"> • Cyber security for Connected Systems SIS • Adaptive controls in Connected Systems CEAS • Data and Sensor Networks in Connected Systems CEAS 	<ul style="list-style-type: none"> • Standards, Quality, and Validation CEAS • Advanced Supply Chain Optimization LSB
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Potential Corporate Partners

- ANSYS
- A.O. Smith Corp.
- Arians
- Badger Meter
- Brady Corp.
- Briggs & Stratton
- BRP
- CISCO
- DRS Technologies
- Eaton
- Fanuc
- GE Healthcare
- Generac
- Harley Davidson
- HUSCO Int
- IBM
- InSinkErator
- Johnson Controls
(both divisions)
- Kohler
- Master Lock Co.
- Microsoft
- Milwaukee Tools
- Oshkosh Corporation
- Plexus Corporation
- Regal-Beloit Corp.
- Rexnord
- Rockwell Automation
- Sargento Foods
- Snap-on Tools Inc.
- SPX Transformer
Solutions
- We Energies

CSI Facilities

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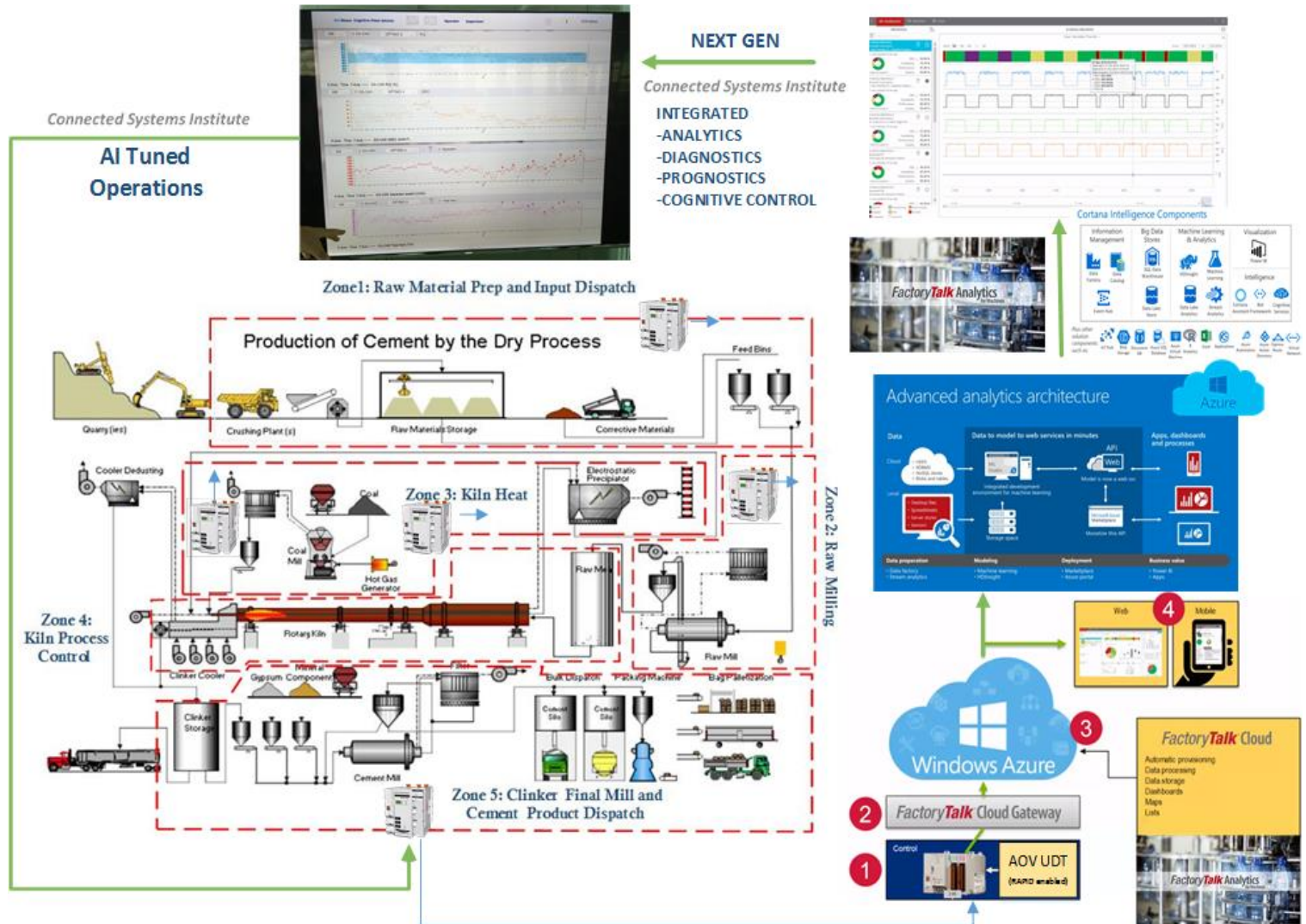


CSI Test Beds

- ***Advanced Manufacturing Flexible Cell:*** A scalable plug and play configuration with rack-level sub-process stations connecting to a modular conveyor system.
- Allowing complex sensing-control-data hardware running various levels of embedded, encapsulated, and distributed software.
- The processes range from simple pick and place to multi-level sortations and assemble robotics, to additive manufacturing stations.
- The medium size cell is fully integrated modular machine cell containing integrated machining, joining, forming sub-cells and higher difficulty sensing-control-data process.
- ***Distributed Water Processing Cell.***
- ***Energy Optimizing Distributed Industrial Power Network.***

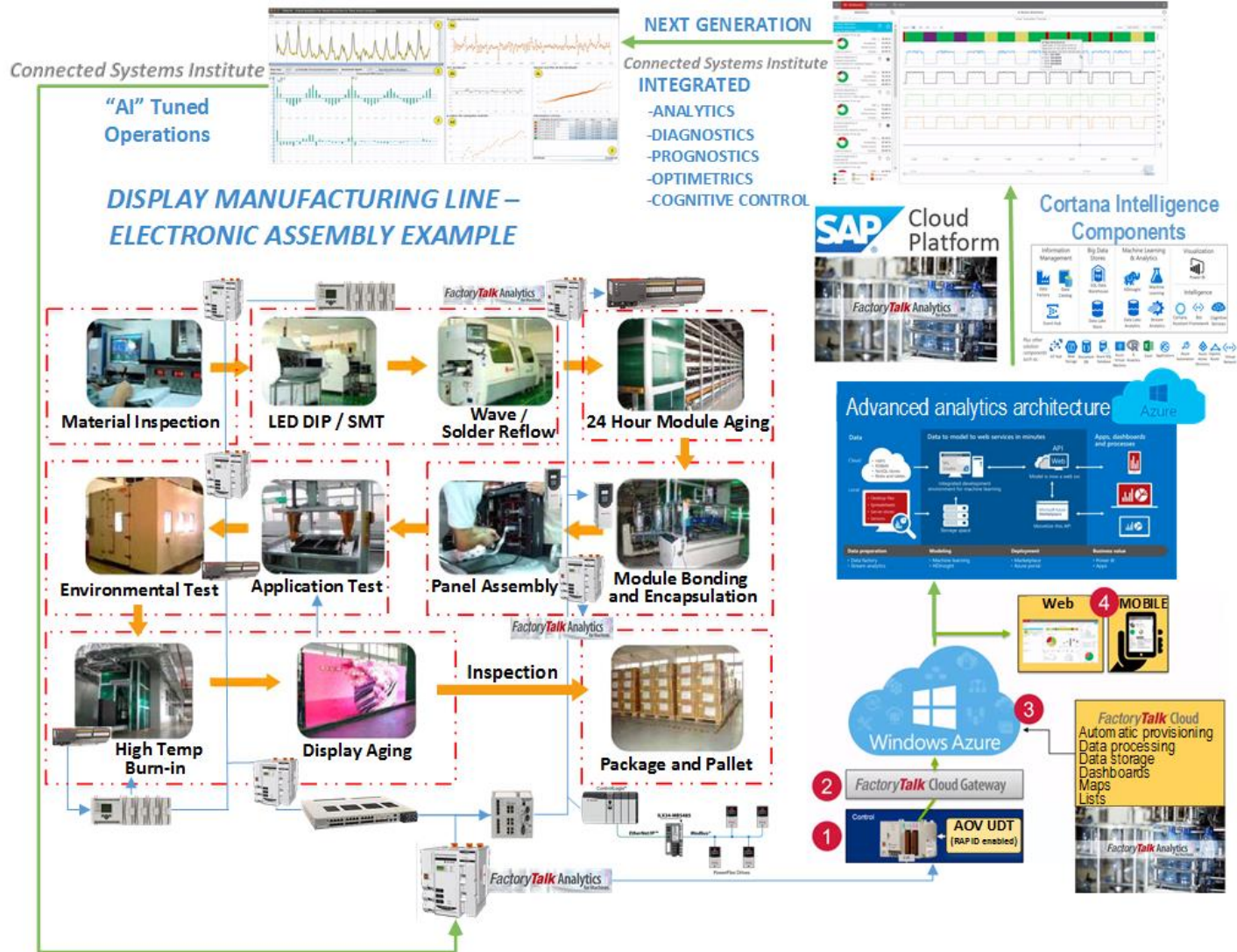
CSI Test Plant Example

Example test plant setup for a cement factory.



CSI Test Plant Example

Example test plant setup for an electronic assembly factory.



CSI Offerings

1. Use of facilities and equipment.
2. Participate in and receive results from pre-competitive research.
3. Ability to conduct company specific research.
4. Non-exclusive intellectual property at no cost and exclusive IP at additional cost.
5. Professional MS program on Connected Systems.
6. Executive Education on Connected Systems.
7. UG Certificate on Connected Systems.
8. Participate in CSI conferences.
9. Membership in the Steering Committee.
10. Membership in Industry Advisory Committee.

CSI Offerings (cont'd)

11. Eligible for company specific day to discuss company industrial connectivity.
12. Participate in industry executive day.
13. Membership in one or more of the CSI-connected research organizations (Supply Chain Management Institute, Center for Embedded Systems, Grid-connected Advanced Power Electronics I/UCRC, Water Equipment & Policy I/UCRC).
14. Company specific virtual factory setup.
15. Receive proportional number of votes on research projects.
16. Option to do research projects under CSI at lower overhead rates.
17. Participate in UWM career fair and receive prime booth placement.
18. Opportunity to participate and present at CSI annual conferences and monthly webinars.

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Membership Levels

- **Founding member: \$2.5M over five years.**
- **Sustaining member: \$1M over five years**
- **Associate member: \$250K over five year**
- **Academic member: \$200K to enter and \$20K annually**
- **Fee-based user agreement for Small and Medium Enterprises (SME)**