WAYNE STATE UNIVERSITY

2012-2017

College of Engineering Strategic Plan

Improving Quality of Life

Through Education, Innovation & Entrepreneurship

Wayne State University

MISSION: WHO WE ARE

At Wayne State University, the mission of the College of Engineering is to:

- Deliver mastery of engineering principles, advanced knowledge of the latest techniques in discipline, and the ability to innovate in a global economy.
- Engage faculty, graduate and undergraduate students in basic & applied research leading to innovative solutions which establish our prominence as a leading research institution in an evolving world.
- Promote entrepreneurship for students & faculty.

VISION: WHO WE STRIVE TO BE

The vision of the College of Engineering is to be a premier engineering college known for improving quality of life through education, innovation & entrepreneurship.

PLANNING PURPOSE

The purpose of this plan is to provide a roadmap for efficiently achieving our long term goals and to bring to life *the Five Pillars to a Wayne State Engineering and Computer Science Education*:

- Experiential learning through co-ops and internships
- Hands-on experience
- Global experience
- Scholarships
- Undergraduate research

While we realize no plan can accurately predict the challenges that lay ahead, the action plans that follow provide a basis for acknowledging what has helped the College to achieve past success and anticipate a path for navigating future opportunities.

The planning period is for the 2012 -2017 academic years.

PLANNING PROCESS

The process engaged a highly diverse team of individuals representing each of our key stakeholders and built upon the strong foundation of previous planning initiatives. With direction from Steering Committee members (roster provided in Appendix A) and the engagement of fluid action plan teams, goals were refined with input from survey participants and a broad cross section of College stakeholder members at a retreat held in September, 2012.

MISSION ELEMENTS

Three interdependent mission elements were identified as key drivers of this plan: Education, Research and Entrepreneurship. All action plans cascade from these core processes.
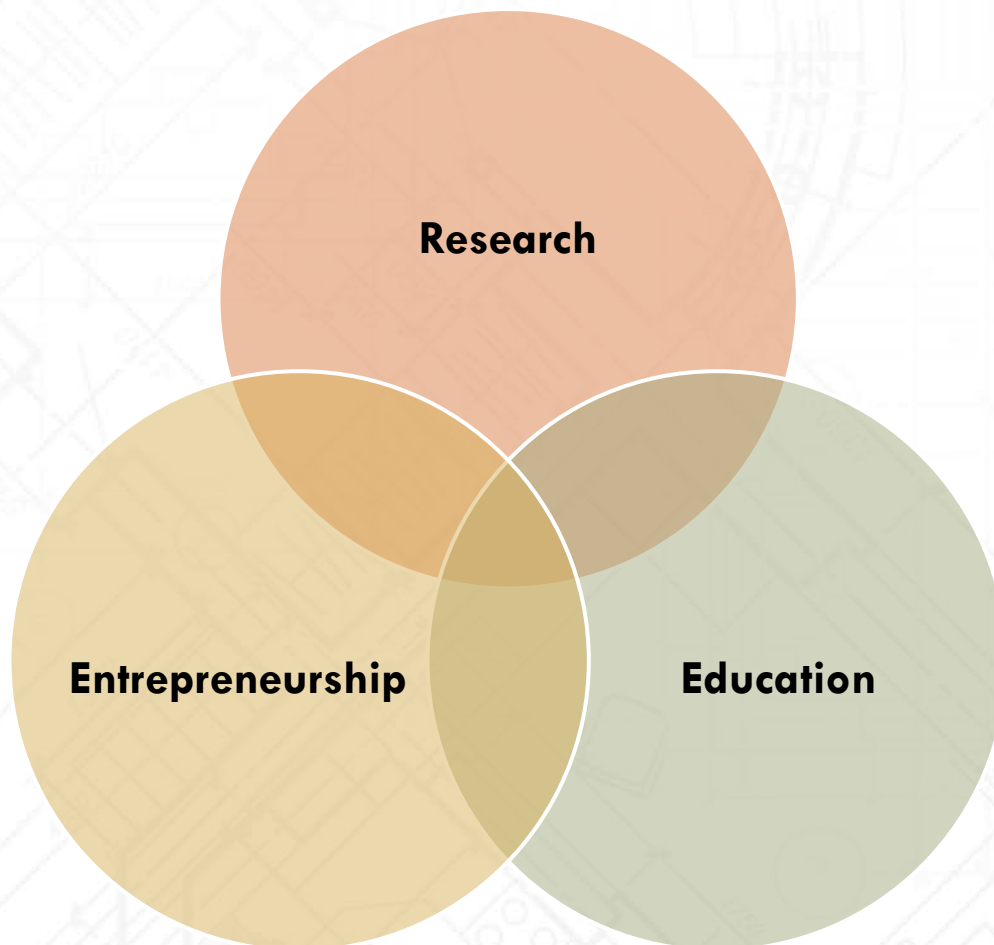
RESEARCH

Engaging faculty, graduate and undergraduate students in basic and applied research to lead to innovative solutions

Wayne State University is known for research. The Carnegie Foundation for the Advancement of Teaching designates Wayne State as RU/VH, a Research University (Very High research activity), a distinction shared by only 2.3 percent of American universities. The College of Engineering improves quality of life through initiatives stemming from three research thrusts:

Biomedical Engineering ● Green Technologies ● Manufacturing

Three elements have been identified as levers for continued research success:

EXTRAMURAL FUNDING

A continuous and steady increase in research expenditures has been realized from 2006-11, from $15.1 million to $21.8 million. As the College seeks continued funding growth, the following strategic goals have been identified:

- Increase extramural funding by 50% from $18M to $27M
- Enhance NSF Ranking (Research Expenditure) from 100+ to Within 100
- Establish a Federal/Industrial-Funded Center of Excellence

RESEARCH PRODUCTIVITY

The College has active faculty, recognized as world leaders for conducting pioneering research and development. To further the College's progress in supporting and recognizing research activity, the following strategic goals have been identified:

- Increase Ph.D. productivity by 23%
- Increase department average H-index percentage from 10 to 11
- Increase research funding per faculty from $150K to $190K

GRADUATE PROGRAMS

With most College of Engineering graduate programs ranked in the top 100 of the 2013 U. S. News and World Report, ensuring the ongoing success of graduate students is key. The following strategic goals have been identified:

- Increase the number of newly enrolled graduate students by 50%
- Increase graduate student retention by 25%
- Enhance the quality of Ph.D./M.S. students with a GPA increase from 3.5/3.1 to 3.6/3.2
- Increase the number of 3 + 2 and international programs by 53%

		Extramural Funding		
ACTION PLAN FOR				

CHAMPIONS: Research Advisory Committee

STRATEGIC INITIATIVE: Engage faculty, graduate and undergraduate students in basic and applied research leading to innovation solutions

STRATEGIC OBJECTIVE: Research / Innovation

STRATEGIC GOALS	Baseline	YEAR 1	YEAR 3	YEAR 5
Increase extramural funding by 50% from $18M to $27M	$18M	$18M	$22M	$27M
Enhance NSF Ranking (Research Expenditure) from 100+ to within 10	116	116	100-110	within 100
Established a federal/industrial funded Center of Excellence	0	0	0	1

ACTION STEPS	MEASURABLES	YEAR 1	YEAR 3	YEAR 5	STAKEHOLDERS	RESPONSIBILITY
1. Hire 25 new faculty members in targeted areas of growth.	Number of Faculty Hired	5	15	25	College	Provost, Dean, and Chair
2. Develop COE Centers/Research Clusters in target research areas to enhance the visibility of WSU and to pursue federal Center Grants. Provide one course release/year to Center Director, and $100k/year seed funding for center activity. Renewable up to a total of 3 years	Number of COE centers formed	2	4	6	College	OVPR, Deans, RAC
	Center Grant Prposal Submitted			3		
3. Strategically target areas of growth by promoting multi-investigator, multi-disciplinary, multi-university projects. Provide one course release/year for project director developing large, multidisciplinary proposals (> $1 M/year).	Number of large, multidisciplinary proposals	1	4	10	College	OVPR, Deans, RAC
4. Provide additional IDC incentives to joint proposals (e.g. 25% of COE and Departmental IDC to faculty's IDC account).	Number of joing proposals funded per year	20	30	40	College	OVPR, Deans, RAC
5. Increase proposal success by utilizing OVPR Pre-Submission Review Program, organizing study groups and grant writing workshops.	Success rate (%)	20	22	25	College	OVPR, Deans, RAC
6. Total number of faculty visits to federal agency & laboratories, and faculty participation in conferences organized by federal agency.	Number of visits and conferences	10	50	100	College	OVPR, Deans, RAC
7. Enhance Research Support Services	Annual Research Support Services Satisfaction Survey	70% (Very Satisfied + Satisfied)	80%	90%	College	OVPR, Deans, RAC
8. Total number of Training Grants (e.g. NSF IGERT and NIH Training Gr	Number of training grant	0	1	2	College	OVPR, Deans, RAC
9. Testing and Characterization Services (e.g. nFab, Materials Characterization Laboratory)	External Annual Revenues	$50K	$150K	$300K	College	OVPR, Deans, RAC
10. Enhance corporate engagement activities.	Number of engagement activities per year	5	10	15	College	OVPR, Deans, RAC

REQUIREMENTS
Faculty, RAC, Chair, and Deans time
Leadership from Administration
Seed Funding for target research areas
Travel Support for faculty to visit federal agencies/laboratories
Seed Funding for Centers/Research Clusters
Marketing of Faculty Research and Core Research Facilities
Enhance pre- and post award services
Leadership to form and motivate teams

Potential Target Research Clusters:

Advanced Manufacturing and Materials, System Biology, Automotive Safety, Alternative Energy Systems, Advanced Energy Storage, Automotive Engineering/Electrification, Sustainability, Biomedical Engineering, Bioinformatics/ Genomics, Nano-Medicine, Healthcare Engineering, Nanotechnology, Big Data Science, Business Analytics.

SOURCES

EXPECTED OUTCOMES/ BENEFIT
Increase in College extramural research funding
Increase in College ranking
Increase in Faculty and Graduate Student Quality
Better placement of Graduate Students
Increase in intramural funding for research & infrastructure

ACTION PLAN FOR	**Research Productivity**			

CHAMPIONS: Research Advisory Committee

STRATEGIC INITIATIVE: Engage faculty, graduate and undergraduate students in basic and applied research leading to innovation solutions

STRATEGIC OBJECTIVE: Research / Innovation

STRATEGIC GOALS	Baseline	YEAR 1	YEAR 3	YEAR 5
Increase Ph.D. Productivity	37	38	42	48
Department Average H-index (% increase)	10	10	10.5	11
Increase Research Funding per faculty	$150k	$150k	$170k	$190k

ACTION STEP	MEASURABLES	YEAR 1	YEAR 3	YEAR 5	STAKEHOLDERS	RESPONSIBILITY
1. Support Strategic Recruitment & Hiring in Theme Areas (e.g., Advanced Manufacturing, Energy, Biomedical Engineering, Data Science and Engineering)	Number of cluster hire	5	15	25	College	Provost, Deans, and Chairs
2. Develop Research Incentive & Rewards Program (balance of teaching, research and service workload, bonus incentive, GRA tuition payment)	Number of incentives and rewards programs	2	4	6	College	Provost, Deans, and Chairs
3. Enact an equitable workload policy for research active faculty.	Policy adoption	1	1	1	College	Deans and Chairs
4. Provide incentive for faculty to publish in top-tier journals & conferences	Average Departmental H-index	10	11	11	Faculty	Deans and Chairs
5. Identify multi-disciplinary working groups to develop group proposals	Number of groups formed	2	4	10	Faculty	Deans and Chairs
6. Provide quality cluster research space with support staff	Number of Cluster Research Facilities	1	3	5	College	Deans and Chairs
7. Develop fund raising strategy for Chair/Endowed Professorship and Endowed Fellowship	Number of Chair/Endowed Professorships and Fellowships	1	3	5	College	Deans, Chairs, and Development Office
8. Provide recognition for faculty who achieve Fellow status of professional society or receive external awards	Number of Fellows and External Awards	8	12	16	College	Deans and Chairs
9. Encourage Education/Curriculum Research	Number of Curriculum Research Projects	1	3	5	Faculty	Deans and Chairs
10. Develop joint international research programs to enhance visibility	Number of international programs developed	1	3	5	College	Deans and Chairs

REQUIREMENTS
Faculty, RAC, Chair, and Deans time
Leadership from Administration
Funding for Cluster Research Facilities and Support Staff
Funding for Incentive Programs
Seed Funding for Research Stimulation
Better Marketing and Communication of Faculty Research
Leadership to Form and Motivate Teams
Development Office

SOURCES

EXPECTED OUTCOMES/ BENEFIT
Increase in College Research Productivity
Increase in External Recognition and Reputation for Research
Increase in Faculty and Graduate Student Quality
Better Placement of Graduate Students
Increase in Intramural Funding for Research and Infrastructure

ACTION PLAN FOR	Graduate Programs

CHAMPIONS: Graduate Program Officers Committee

STRATEGIC INITIATIVE: Engage faculty, graduate and undergraduate students in basic and applied research leading to innovation solutions

STRATEGIC OBJECTIVE: Research / Innovation

STRATEGIC GOALS	Baseline	YEAR 1	YEAR 3	YEAR 5
Increase the number of graduate student newly enrolled by 50 %	180	200	235	270
Increase the number of graduate student enrolled by 25%	800	820	900	1000
Enhance quality of graduate students (Ph.D./M.S.)	WSU GPA 3.5/3.1	3.5/3.1	3.55/3.15	3.6/3.2
Increase number of 3 + 2 and international programs	7	7	11	15

ACTION STEPS	MEASURABLES	YEAR 1	YEAR 3	YEAR 5	RESPONSIBILITY
1. Increase recruitment activities (Recruitment visit to foreign universities and Mid-west universities, tuition scholarship, HTML email campaign, virtual orientation, promotional youtube video)	Number of graduate applications	1800	2000	2200	Deans, Chairs, GPO
2. Increase mentoring and advising activities (annual evaluation, plan of work)	% completion of annual evaluation & Plan of Work	70	80	90	Chairs and GPO
3. Increase number of Fellowships, Graduate Research Assistantships, and tuition scholarships	Number of awards	60	80	100	Chairs and Deans
4. Integrate with PAD seminars for Ph.D. students in Science and Engineering	Number of PAD seminars for graduate students	2	3	4	GPO, OVPR
5. Recruitment of Domestic Graduate Students (M.S./Ph.D)	% of Domestic Students (M.S./Ph.D)	10	15	20	Deans, Chairs, GPO
6. Better internal funding model to increase number of Ph.D. students supported on GTA.	Implementation of new model, number of GTA	70	80	90	Deans, GPO, Graduate School
7. Create new graduate course on "Research Methodology and Proposal Development"	Number of courses developed	1	2	2	Deans, Chairs, and Faculty
8. Develop alumni database and tracking system	Systems Developed for Departments	2	4	8	Development Office
9. Develop marketing materials (Brochure and Videos)	Number of Brochures and Videos	8	16	32	Marketing and Communications
10. Increase entrepruneurial activitivies by graduate students	Number of activities	2	4	6	GPO, RAC

REQUIREMENTS

Faculty, GPO, Chair, and Deans time

Leadership from Administration

Funding for recruitment activities

Funding for increase number of Fellowships, Assistantships, and tuition scholarships

Better Marketing and Communication for student recruitment

Coordination with Graduate School and Graduate Admissions

SOURCES

EXPECTED OUTCOMES/ BENEFIT

Increase in number of graduate students produced

Better placement of Graduate Students

High quality graduate programs

Increase in College ranking

Increase in intramural and extramural funding for graduate education

EDUCATION

Delivery mastery of engineering principles, advanced knowledge of the latest techniques in discipline and the ability to innovate in a global economy

Wayne State University is committed to providing students with relevant and innovative courses and interdisciplinary programs, hands-on practical experience using the latest research technologies and the best resources possible to succeed upon graduation.

The heart of the College's *Five Pillars to a Wayne State Engineering and Computer Science Education* rests with many of the key elements noted below which are designed to strengthen the student experience and academic and professional success.

INCREASING THE NUMBER OF ENGINEERING GRADUATES

Utilizing benchmarking from the American Society for Engineering Education (see Appendix B), the degree yield for Wayne State engineering degrees in the fourth to fifth year of enrollment is competitive with our peers. To continue to improve progress made in this area, the following goals have been identified:

- Increase graduates 50% overall (8.5%/year)
- Increase enrollment 50% overall
- Improve time to graduate

IMPROVED STUDENT PREPARATION

To ensure student success in the classroom and in the workplace, the following strategic goals have been identified:

- Revise/modernize curriculum to provide needed skills for 2012 +
- Enhance interventions for student academic success
- Support curriculum and teaching innovation
- Increase undergraduate research
- Increase number of scholarships to reward success
- Increase number of students participating in hands-on experience, such as FSAE competition and Concrete Canoe

INCREASED STUDENT CAREER SUCCESS

To help students prepare for the world of work, job placement will be an area of focus.

ENHANCED GLOBAL EXPERIENCE FOR ALL ENGINEERING GRADUATES

To prepare students to innovate in a global economy, the following strategic goals have been identified:

- Establish/increase overseas programs
- Establish partnerships with American/foreign companies for internships and awareness seminars
- Establish "Engineers Without Borders"

ACTION PLAN FOR

Increase Number of Engineering Graduates

CHAMPIONS: Ellis, Potoff, Ng

STRATEGIC INITIATIVE: Deliver mastery of engineering principles, advanced knowledge of the latest techniques in discipline and the ability to innovate in a global economy

STRATEGIC OBJECTIVE: Education

ACTION STEP	MEASURABLES	2012 START	2017 END	STAKEHOLDERS	RESPONSIBILITY
Increase Graduates 50% overall (8.5%/yr)					
Increase BS Graduates	No. of graduates	129	194		Admissions, Dean's office, Department Chairs.
Increase MS Graduates	No. of graduates	253	380	Students, Faculty	
Increase PhD Graduates	No. of graduates	50	75		
Increase Enrollment 50% overall					
Increase BS Enrollment	Headcount enrolled (Fall)	1506	2259		Admissions, Dean's office, Department Chairs.
Increase MS Enrollment	Headcount enrolled (Fall)	560	840	Students, Faculty	
Increase PhD Enrollment	Headcount enrolled (Fall)	310	465		
Increase No. of Students Admitted					
Increase BS admissions	No. of admitted students (Fall)	900	1350		Admissions, Dean's office, Department Chairs.
Increase MS admissions	No. of admitted students (Fall)	500	750	Students, Faculty	
Increase PhD admissions	No. of admitted students (Fall)	60	90		
Increase No. of Applicants					
Increase BS applicants	No. of applications (Fall)	2200	3300		Admissions, Dean's office, Department Chairs.
Increase MS applicants	No. of applications (Fall)	1275	1900	Students, Faculty	
Increase PhD applicants	No. of applications (Fall)	430	650		
Improve Time to Graduate					
Implement high-impact retention practices	# students in Undergraduate Researc	10	50	Students, Faculty	Ellis, UROP Committee
	# students in Learning Communities	50	100	Students, Faculty	Ellis, Potoff
Create an accelerated 3 year BS program	Establish plan of work, Implement course schedule plan	Plan	Establish & Offer	Students, Faculty	Potoff
Identify and Eliminate curriculum bottlenecks.	Analysis completed, number of curriculum & schedule changes implemented	Investigate	Evaluate	Students, Faculty	Advisors, Program Officers
Intrusive Advising for Efficient Plan of Work	Degree Works) POW implemented for all majors, Students trained in use	Plan	100% students use e-POW	Students, Faculty	Advisors, Program Officers

REQUIREMENTS	SOURCES
Funding needed to increase student recruitment via improved website, viral advertising (YouTube, blogs etc.) and print marketing.	Source of funding?, Marketing & Communications support
Incentive structure for innovative teaching	For Jeff P's Input, what could be source for incentive? What people, resources, policy is needed?
Staff and space for student "one stop shop" for problem resolution	Source of funds, staff?

EXPECTED OUTCOMES/ BENEFIT
Increased student enrollment and retention
Improved student time to graduation

Improved Student Preparation

CHAMPIONS: Ellis, Potoff
STRATEGIC INITIATIVE: Deliver mastery of engineering principles, advanced knowledge of the latest techniques in discipline and the ability to innovate in a global economy
STRATEGIC OBJECTIVE: Education

ACTION STEP	MEASURABLES	START	END	STAKEHOLDERS	RESPONSIBILITY
Revise/Modernize Curriculum to Give Students Skills Needed for 2012+					
1. Revise BE 1200 and new BE 1500 to include entrepreneurship in curriculum.	Curriculum revision implemented	Year 1: Fall 2012	Ongoing	Students, faculty	Ellis, Potoff, Philippart
1b. Revise BE 1310 lab	Lab revision completed	Year 2:	Year 3	Students, faculty	Potoff
1c. Develop new discipline specific design projects for BE 1200	Number of projects created	Year2	Ongoing	Dept. Chairs, faculty, students	Potoff
		Year 5	Ongoing		
2. Develop new elective courses in "hot" areas.	Number of elective courses developed	Year 1: Fall 2012	Ongoing	Students, faculty	Ellis
2a. Survey employers for skills needed beyond typical engineering degree	Survey data collected from employeers. Number of empolyer responses.	Year 2	Year 3	Students, faculty	Ellis
2b. Study curriculums/electives of engineering programs at other universities	List of potential elective courses.	Year 1: Fall 2012	Year 2	faculty	Ellis
2c. Survey recent graduates for ideas on technical elective course ideas.	List of potential elective courses.	Year 2	ongoing	students,faculty	Ellis
2d. Partner with other universities to offer specialty coures over Internet.	Number of courses offered	Year 3	Ongoing	Students, faculty	Ellis
Enhance Student Academic Success Interventions					
3. Implement interventions and to improve student academic success				Students, faculty	Potoff
3a. Develop proposal for interventions	Interventions proposed	Year 1: Fall 2012	Ongoing	Students, faculty	Potoff
3b. Implement learning communities	Learning communities implemented	Year 3	Ongoing	Students, faculty	Potoff
3c. Implement additional interventions	Additional interventions implemented	Year 5	Ongoing	Students, faculty	Potoff
Support Curriculum & Teaching Innovation					
4. Revise the AOC to emulate the TAG group with additional responsibilities for curriculum and teaching innovation.	Committee Revisions Adopted	Year 1: Fall 2012	Ongoing	Students, faculty	Dean's office, FAEC
4a. Develop membership criteria.	Members Selected Based Upon Agreed Upon Criteria	Year 1: Fall 2012	Year 1 Winter 2013	Students, faculty	Dean's office, FAEC
4b. Develop committee charter.	Charter Adopted	Year 2	Fall 2013	Students, faculty	Dean's office, FAEC
4c. Develop recommendations.	Number of Recommendations Implemented	Year 2	Ongoing	Students, faculty	Dean's office, FAEC
4d. Introduce innovative teaching methods/technologies to improve student learning	Number of methods/technologies introduced; Number of courses and students impacted.	Year 3	Ongoing	Students, faculty	Dean's office, FAEC
4e. Develop teaching training program for new faculty.	SET scores of faculty, survey of learning outcomes.	Year 2	Ongoing	Dept Chairs, faculty, students	Dean's office, FAEC

Improved Student Preparation *Continued*

5. Institute faculty committee for teaching load and teaching quality oversight.	Teaching load policy adoption; teaching quality improvement as measured by SET scores and student surveys of course learning objectives	Year 1	Ongoing	Students, Faculty	Dean's office, FAEC
6. Secure external funding for curriculum innovation		Year 1	Ongoing	Students, Faculty	Ellis, Potoff
6a. Create database of funding opportunities for education innovation, research and implementation.	Database created	Year 1	Ongoing	faculty	Ellis, Potoff
6b. Create database of faculty education interests; form teams to draft proposals	Number of teams form and number of faculty engaged in the process	Year 1	Ongoing	faculty	Ellis, Potoff
6c. Submit proposals to support educational activities (research, implementation).	Number of proposals submitted; total dollars in grants awarded; research expenditures	Year 3	Ongoing	faculty	Ellis, Potoff

Increase Undergraduate Research

Integrate undergraduate research into the curriculum	Number of students participating in undergraduate research	Year 1: Fall 2012	Ongoing	Students, Faculty	Ellis, Dept Chairs, undergraduate program coordinators
Incease funding for undergraduate research	Number and total dollar amount of REU supplements received by WSU faculty. Number of dollars awarded by industry.	Year 3	Ongoing	students, faculty	Ellis
Create an REU site	Award of REU	Year 5	Ongoing		Ellis

REQUIREMENTS	SOURCES
Incentive structure for innovative teaching, curriculum revision	Provost's office, Dean's office.
Lab and classroom facility upgrades as agreed upon in proposal to be completed ____	Provost's office, capital campaign.

EXPECTED OUTCOMES/ BENEFIT

Increased student enrollment and retention

Improved student time to graduation
Improved job placement

ACTION PLAN FOR	Increase Student Career Success

CHAMPIONS: Career Resource Center Program Coordinator, Ellis

STRATEGIC INITIATIVE: Deliver mastery of engineering principles, advanced knowledge of the latest techniques in discipline and the ability to innovate in a global economy

STRATEGIC OBJECTIVE: Education

ACTION STEP	MEASURABLES	2012 START	2017 END	STAKEHOLDERS	RESPONSIBILITY
Improve Job Placement 1. Increase job placement by expanding access to employers through career fairs and alumni networking (i.e. LinkedIn/other social media).					
	Job placement rate	Current level	Peer benchmark		
	No. of career fairs & events hosted	1	5	Students, faculty	Career services office
	No. employers at career fairs	50	100		
	No. students registered in co-op BE 3500 & 3510 (S/S Term)	50	250		
2. Improve employer feedback pertaining to quality of graduates. Utilize feedback in curriculum revision.	Employer feedback rate	0	100%	Students, faculty	Career services office, Program Officers
	Employer satisfaction with co-op students' (a)-(k)	n/a	100%		
	No. Depts participating	0	8		
3. Incorporate business and industry feedback, initiation and collaboration in capstone design projects.	Number of projects with business and industry partners;	4	50	Students, faculty	Chairs, Capstone Faculty
	Number of departments participating;	2	8		
	Number of students participating	40	100		

REQUIREMENTS   **SOURCES**

Dedicated career services staff member to keep track of alumni and network with them for student job placement

Entrepreneurship exposure   Nancy Phillippart

Liason with industry for the college or perhaps each department to develop projects.

EXPECTED OUTCOMES/ BENEFIT

Improved job placement
Improve institutional reputation
Increased resources

Enhance Global Experience for all Engineering Graduates

CHAMPIONS: Dean's Office
STRATEGIC INITIATIVE: Deliver Mastery of Education….. To Innovate in a Global Economy
STRATEGIC OBJECTIVE: Education

ACTION STEP	MEASURABLES	2012 START	2017 END	STAKEHOLDERS	RESPONSIBILITY
Establish/increase overseas programs	Number of programs where students can be placed for summer research	2	16 (>2 options per program)	Students (primarily undergraduate)	Dean's Office
Establish partnership with American/foreign companies to provide internship opportunities	Number of students interning overseas	0	10	Students, Business & Industry	Eng Career Resouce Center
Enhance awareness of global issues through industry seminar series	Number seminars per year	0	6	Students, Business & Industry	Eng Career Resouce Center
	Number students attending at least one global issues seminar	0	500		
Establish "Engineers without Borders"	Number of participating students	Year 3: Fall 2015	No end projected	Students	Dedicated Staff Needed

REQUIREMENTS   **SOURCES**

External Funding   tbd
Dedicated staff needed   tbd
Students may need foreign language support   tbd

EXPECTED OUTCOMES/ BENEFIT

Increased job placement of students

ENTREPRENEURSHIP

Promote entrepreneurship for students and faculty

Wayne State University's College of Engineering recognizes that engineering and innovation are key drivers of economic growth and job creation. The pioneering research and inventions of our students, alumni and faculty researchers improve our quality of life. In the past five years, engineering inventions have resulted in 62 provisional and non-provisional patent applications, 8 licenses and 5 start-up companies. The College is committed to providing support to help our engineers achieve their goals through four progressive levels of entrepreneurial experiences:

UNDERGRADUATE EXPOSURE

Engineering students will be introduced to the variety of ways an entrepreneurial spirit can take shape in courses and curriculum where it is a good fit. The following strategic goals highlight a desire to exposure all undergraduates to this concept:

- Reconfigure, implement and evaluate course and curriculum changes, starting with Basic Engineering
- Develop and pilot seminars and speaker series

STUDENT ENGAGEMENT

Undergraduate and graduate engineering students will be offered the opportunity to explore entrepreneurism further in a variety of activities such as those noted in the below strategic goals:

- Develop and grow internship program and faculty-directed research opportunities
- Host competitions to showcase student innovation and grow entrepreneurial connections
- Develop and implement a cross-functional new venture project course
- Reconfigure the Engineering Entrepreneurship Certificate Program

VENTURE CREATION

Through a variety of initiatives such as Wayne State's Blackstone Launchpad and Connect Services' Ventures, resources are available and partnerships among undergraduate and graduate students, alumni, and inventors have been created and nurtured. To spur continued growth, the following strategic goals have been identified:

- Increase awareness of student and faculty funding in SBIR/STTR grants, other venture capital sources
- Support student participation in venture start-up competition
- Engage undergraduate students in university research
- Recognize faculty support of student venture creation

ALUMNI ENGAGEMENT

With many successful, active alumni entrepreneurs, the College seeks to develop stronger partnerships.

ENTREPRENEURIAL CULTURE

As growth continues in this area, the College seeks to embed best practices and integrate support and recognition offerings to spur a culture and spirit of entrepreneurism.

ACTION PLAN FOR	100% Undergraduate Exposure to Entrepreneurship

CHAMPIONS: NP, ISE & BME Chairs
STRATEGIC INITIATIVE: Promote entrepreneurship for students and faculty
STRATEGIC OBJECTIVE: Entrepreneurship

ACTION STEP	MEASURABLES	START	END	STAKEHOLDERS	RESPONSIBILITY
1. Reconfigure BE courses to include entrepreneurship	New courses	Fall: 2012	Mar: 2013	students	Jeff P & others as assigned by Dean
2. Implement new BE courses for freshmen	Changed curriculum	Fall: 2013	ongoing	students	Dean's office
3. Evaluate BME/ISE/CS curriculum to find natural places to include entrepreneurship	Changes to curriculum	Fall:2012	Mar:2013	students	BME/ISE/CS Chairs
4. Implement changes to BME/ISE/CS curriculum	Changed curriculum	Fall: 2013	ongoing	students	BME/ISE/CS Chairs
5. Identify BME/ISE/CS faculty to champion	Assigned faculty	Fall: 2012	Mar:2013	students, faculty	BME/ISE/CS Chairs
6. Develop & pilot seminars for students to learn basic financial, legal & marketing skills - BME/ISE/CS curriculum req'mts	Student attendance	Winter: 2013	ongoing	students, faculty	BME/ISE/CS Chairs/NP
7. Develop entrepreneurial alumnae speaker program and pilot monthly speaker series	No. of speakers & student attendance	Winter: 2013	ongong	students, faculty	BME/ISE/CS Chairs/NP
8. Identify students interested in going beyond awareness	No. of students in CEO (Collegiate Entrepreneurs Organization)/engaged in research/interning w/ startups	Fall: 2012	ongoing	students, faculty	BME/ISE/CS Faculty
9. Expand to other engineering departments	Depts. Changed	Fall: 2013	Fall:2015	students, faculty	Dean's office/chairs

REQUIREMENTS   **SOURCES**

REQUIREMENTS	SOURCES
Resources to reconfigure curriculum	Dean's office
Approval for curriculum changes	Dean's office
Support from BME/ISE departments	BME/ISE Chairs
Modest ($1000) financial support for seminars/speaker honorariums	Dean's office
Engaged faculty	Dean's office

EXPECTED OUTCOMES/ BENEFIT
Improved & marketable student skills
Pipeline of students for experential learning & venture creation
Improved college reputation

ACTION PLAN FOR	**Student Engagement in Experiential Learning**				
CHAMPIONS: NP, ISE & BME Chairs					
STRATEGIC INITIATIVE: Promote entrepreneurship for students and faculty			**OBJECTIVE:** Entrepreneurship		

ACTION STEP	MEASURABLES	START	END	STAKEHOLDERS	RESPONSIBILITY
1. Develop funding source (other than Work Study $) for 50/50 cost share for student internships at startups	Raise $15K for pilot; $50K annually	Winter: 2013	ongoing	students, startups	Fund development officer
2. Pilot internships with 1-2 students	Successful pilot	Summer 2013	Summer 2014	students, startups	Career Services
3. Identify 1-2 BME/ISE/CS undergraduate student with interest in entrepreneurship & engage in faculty directed research	1-2 students engaged in faculty directed research	Winter: 2013	ongoing	students, faculty	BME/ISE/CS Chairs
4. Host college wide business plan competition; engage alumni as judges	25 student participants	Winter: 2013	Spring:2013	students, faculty	Nancy Philippart/CEO/ESFB
5. Rework Engineering Entrepreneurship Certificate Progam to include both undergrad and grad students	Revised program and BOG approved program	Winter: 2013	Spring:2013stu	students, faculty	Nancy Philippart/Dean's office designate
6. Develop crossfunctional new venture project course modelled after Northwestern/Univ of Iowa; focus on biomed; gain support from other colleges; provide credit for BME degree; engage alumni as mentors	No. of students in CEO (Collegiate Entrepreneurs Organization) engaged in research/interning w/ startups	Winter:2014	Spring:2014	students, faculty	Nancy Philippart/Dean's office designate
7. Implement cross functional project course	3 teams of students	Fall:2014	Winter:2015	students, faculty	BME Chair
8. Host college wide 'make fair'	20 student participants	Winter;2014	ongoing	students,faculty	Faculty; chairs
9. Relaunch reconfigured Engineering Entrepreneurship Certificate Progam	10 students registered	Fall;2013	ongoing	students; faculty	Dean's office/chairs
10. Increase internships to 20/year	20 students with 20 companie	Fall: 2014	ongoing	students, startups	Career Services
11. Expand undergrad student research engagement to other departments	25 student participants	Fall:2014	ongoing	students, faculty	Dept chairs

REQUIREMENTS	SOURCES	EXPECTED OUTCOMES/ BENEFIT
$50K annual funding source for internships	Alumni, grants	Improved & marketable student skills
Approval for certificate changes	Dean's office	Pipeline of students for venture creation
Support from department chairs/faculty for student engagement in research	Chairs	Increased program offerings for grad students
Resource & modest financial support for crossfunctional project course development	Dean's office	Improved college reputation
Engaged faculty	Dean's office	

ACTION PLAN FOR		Support & Acknowledgement for Student & Faculty Venture Creation				
CHAMPIONS: NP, ISE & BME Chairs						
STRATEGIC INITIATIVE: Promote entrepreneurship for students and faculty				**OBJECTIVE:** Entrepreneurship		

ACTION STEP	MEASURABLES	START	END	STAKEHOLDERS	RESPONSIBILITY
1. Develop pipeline of BME/ISE/CS students from engagement in faculty research pilots	# students involved in new ver	Winter: 2013	ongoing	students, faculty	BME/ISE Chairs
2. Educate interested BME/IME/CS students & faculty on SBIR/STTR grant opportunities & other sources of venture capital	# people educated	Spring: 2013	ongoing	students, faculty	Nancy Philippart to procure experts
3. Support attainment of SBIR/STTR or other venture funding	# grants/funding received	Fall: 2013	ongoing	students, faculty	BME/ISE Chairs
4. Engage alumni as mentors	# engaged alumni	Winter: 2014	ongoing	students, faculty, alumni	BME/ISE Chairs
5. Support student participation in venture startup competitions (i.e. Accelerate Mi)	# of students competing; # of students placing	Fall:2013	ongoing	students, faculty	BME/ISE Chairs/NP
6. Work with Tech Commericalization to increase funding for Warrior Fund (seed money for student startups)	Increase fund from one time $25K to annual $50K	Fall:2013	ongong	students, faculty	Fund Dev Office/Tech Transfer
7. Incentivize/recognize faculty who support students in venture creation	Developed incentives like lighter teaching load; stipend $	Fall: 2013	ongoing	students, faculty	Dean/ISE/BME/CS Chairs
8. Expand to other engineering departments	Depts. Changed	Fall: 2013	Fall:2015	students, faculty	Dean's office/Chairs

REQUIREMENTS

Faculty incentives within labor agreement
$50K annual funding for Warrior Fund
Support from BME/ISE departments
Engaged faculty

SOURCES

Dean's office
grants,alumni donations
BME/ISE Chairs
Chairs

EXPECTED OUTCOMES/ BENEFIT

Improved & marketable student skills
New ventures created
Increased $ to university
Improved college reputation

ACTION PLAN FOR | Alumni Engagement |

CHAMPIONS: NP, ISE & BME Chairs
STRATEGIC INITIATIVE: Promote entrepreneurship for students and faculty   **STRATEGIC OBJECTIVE:** Entrepreneurship

ACTION STEP	MEASURABLES	START	END	STAKEHOLDERS	RESPONSIBILITY
1. Identify & develop network of entrepreneurial alums	# of alums	Winter: 2013	ongoing	students, faculty	Chairs/Eng Alum Org
2. Engage alums as mentors, speakers, teachers	# alums engaged	Spring, 2013	ongoing	students, faculty	BME/ISE Chairs
3. Develop advisory board of entrepreneurial alums to provide program input	Functioning board	Fall;2013	ongoing	students, faculty	NP/Dean
4. Expand alum network college wide	# alums engaged	Fall:2014	ongoing	students, faculty, alumni	Chairs
5. Work with other colleges to develop integrated alum network	# of alums engaged university wide	Winter: 2014	ongoing	students, faculty	Deans
6. Seek support from engaged alums for funding for internships, seed capital, venture investment	$ funding	Winter: 2014	ongong	students, faculty	Fund Dev Office

REQUIREMENTS   **SOURCES**
Alumni records   Alumni relations office

EXPECTED OUTCOMES/ BENEFIT
Alums who contribute talent & treasure

	ACTION PLAN FOR	Entrepreneurial Culture

CHAMPIONS: NP, ISE/ CS/ BME Chairs
STRATEGIC INITIATIVE: Promote entrepreneurship for students and faculty
STRATEGIC OBJECTIVE: Entrepreneurship

ACTION STEP	MEASURABLES	START	END	STAKEHOLDERS	RESPONSIBILITY
1. Include entrepreneurship topic in all college/dept meeting; share best practices from other univeristies	Standing agenda topic	Winter: 2013	ongoing	faculty	Chairs/Dean
2. Fund Executive in Residence position	$40 K annual funding; $25 K discretionary expenses	Winter; 2013	ongoing	students, faculty	Dean
3. Expose faculty to successful entrepreneurial alums	# faculty meeting with alums	Winter: 2013	ongoing	faculty, alums	Chairs
4. Promote BME/ISE/CS Dept successes in all college publications	# of communications	Fall;2012	ongoing	students, faculty	Communications Dept
5. Recognize successful faculty & promote incentive for supporting	# of communications	Fall:2013	ongoing	faculty	Chairs & Communication Dept
6. Include entrepreneurship & support of student venture creation as area for faculty assessment for BME/ISE/CS	Expanded assessment process	Winter: 2014	ongoing	faculty	Dean & Chairs
7. Include entrepreneurship/interest in commercialization as discussion point for new faculty hires in BME/ISE/CS	New hire credentials	Winter: 2014	ongoing	students, faculty	Chairs
8. Increase faculty incentives	Desirabilty of incentives	Winter: 2014	ongong	faculty	Dean
9. Expand to other engineering departments	Depts. Changed	Fall: 2013	Fall:2015	students, faculty	Dean's office/chairs

REQUIREMENTS   **SOURCES**
$40K salary; $25K expense funding   Dean's office
Communication support   Communcation Dept
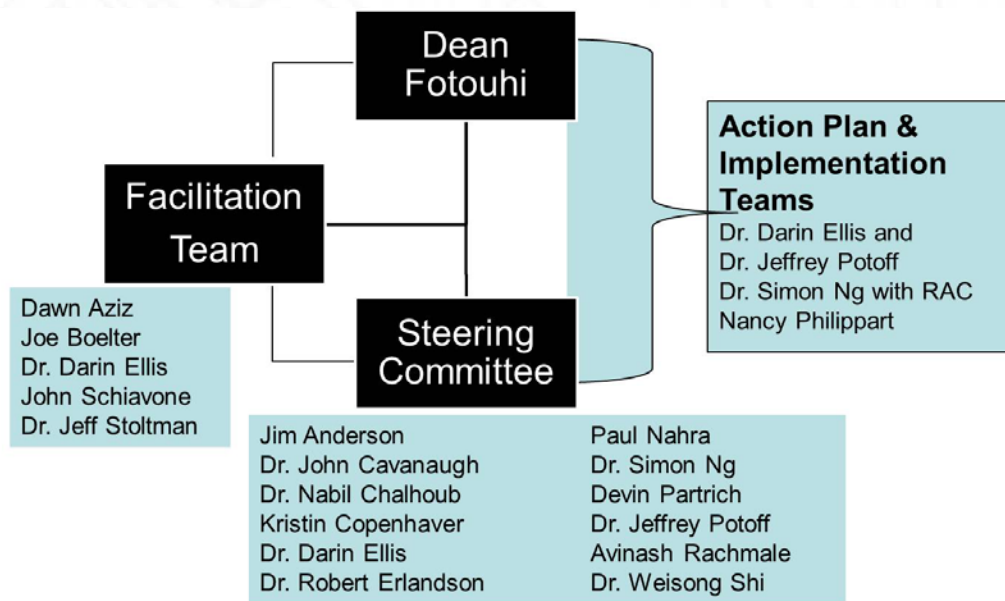Faculty incentives   Dean's office

EXPECTED OUTCOMES/ BENEFIT
Culture that encourages entrepreneurship with aligned incentives

APPENDIX A: PLAN PARTICIPANTS

The planning process, led by Dean Fotouhi in calendar year 2012, convened a cross section of stakeholder representatives in a Steering Committee to look at future opportunities and draft a vision and mission statement. Feedback was sought from College stakeholders on these statements as well as what was most important to consider as the three mission elements, Research, Education and Entrepreneurship, were developed. This formed the basis for action plans. A retreat was held with approximately 50 College stakeholders to seek input and refine these plans. The outcome of this work – and from the diligence of action plan teams – is represented in this plan. Members of the facilitation team offered guidance throughout this planning process.

Dean Fotouhi

Facilitation Team

Dawn Aziz
Joe Boelter
Dr. Darin Ellis
John Schiavone
Dr. Jeff Stoltman

Action Plan & Implementation Teams
Dr. Darin Ellis and
Dr. Jeffrey Potoff
Dr. Simon Ng with RAC
Nancy Philippart

Steering Committee

Jim Anderson
Dr. John Cavanaugh
Dr. Nabil Chalhoub
Kristin Copenhaver
Dr. Darin Ellis
Dr. Robert Erlandson

Paul Nahra
Dr. Simon Ng
Devin Partrich
Dr. Jeffrey Potoff
Avinash Rachmale
Dr. Weisong Shi

APPENDIX B: ASEE BENCHMARKING

ASEE 2011	WSU	MSU	Pitt	U Cinci	Buffalo	UM-AA	MTU	UM-D	OU	LTU
Teaching Faculty - Tenure Track	95	170	114	114	143	362	136	62	47	35
Teaching Faculty - FT Non-Tenure Track	17	8	8	6	5	28	16	0	2	2
Total FT Teaching Faculty	112	178	122	120	148	390	152	62	49	37
Student:Faculty Ratio	10	19	19	22	17	14	22	17	21	16
Total Enrollment - BS - FT	799	3451	2281	2640	2489	5426	3147	697	749	440
Total Enrollment - BS - PT	347	0	42	0	100	159	188	372	259	139
4th-5th Yr Enrollment	237	863	805	432	986	1822	935	185	208	134
BS Applicants	734	3304	3356	2828	3673	8040	2931	815	803	909
BS Admitted	577	3012	2027	2278	1385	3296	2399	507	505	525
BS Enrolled	198	959	492	656	459	1207	880	228	177	162
Yield (admitted to enrolled)	34%	32%	24%	29%	33%	37%	37%	45%	35%	31%
	WSU	MSU	Pitt	U Cinci	Buffalo	UM-AA	MTU	UM-D	OU	LTU
ACT Math 75	28	30	34	31	32	33	30	28	27	30
ACT Math 25	20	25	28	27	27	29	25	23	22	24
ACT Composite 75	28	29	32	30	30	34	29	27	26	28
ACT Composite 25	19	24	28	26	26	28	34	22	20	23
Degrees Awarded	185	466	434	326	587	1284	585	177	144	122
Degree Yield (% of FT enrolled)	23%	14%	19%	12%	24%	24%	19%	25%	19%	28%
Degree Yield (% of 4th-5th yr enr)	78%	54%	54%	75%	60%	70%	63%	96%	69%	91%

	WSU	MSU	Pitt	U Cinci	Buffalo	UM-AA	MTU	UM-D	OU	LTU
ACT Math 75	28	30	34	31	32	33	30	28	27	30
ACT Math 25	20	25	28	27	27	29	25	23	22	24