Alliance 4 Device Innovation

"A place for education and for translation"tm

Pierre D. Mourad, PhD

Director

Alliance 4 Device Innovation

Associate Professor

Division of Engineering and Mathematics (UWB)

Department of Neurological Surgery (UWS)

Department of Bioengineering (Adjunct)

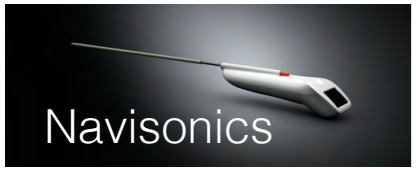
Department of Radiology (Adjunct)

Affiliate

Applied Physics Laboratory

Entrepreneur Faculty Fellow

University of Washington



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The Alliance for Device Innovation (A4DI) provides space and resources that foster multi-year, cross-disciplinary, translational research experiences.

Those experiences include actual and nascent ME Capstone projects, combined ME/EE/other Capstone projects, and projects funded by industry or the federal government. Where possible, Capstone projects overlap with the interests of internal or external sponsors.

A4DI also targets device invention, development and commercialization - that is, translation of work from the laboratory out into the world.

ME Capstone structure.

a cohort model - senior ME students start in fall and proceed through a prescribed three-quarter sequence.

a cross-disciplinary model - most desirable projects involve students from a variety of disciplines, including Electrical Engineering, Computer Engineering, Computer Science, Biology, among others.

a cross-generational model - optimal teams include not only seniors but also juniors, sophomores, and freshman.

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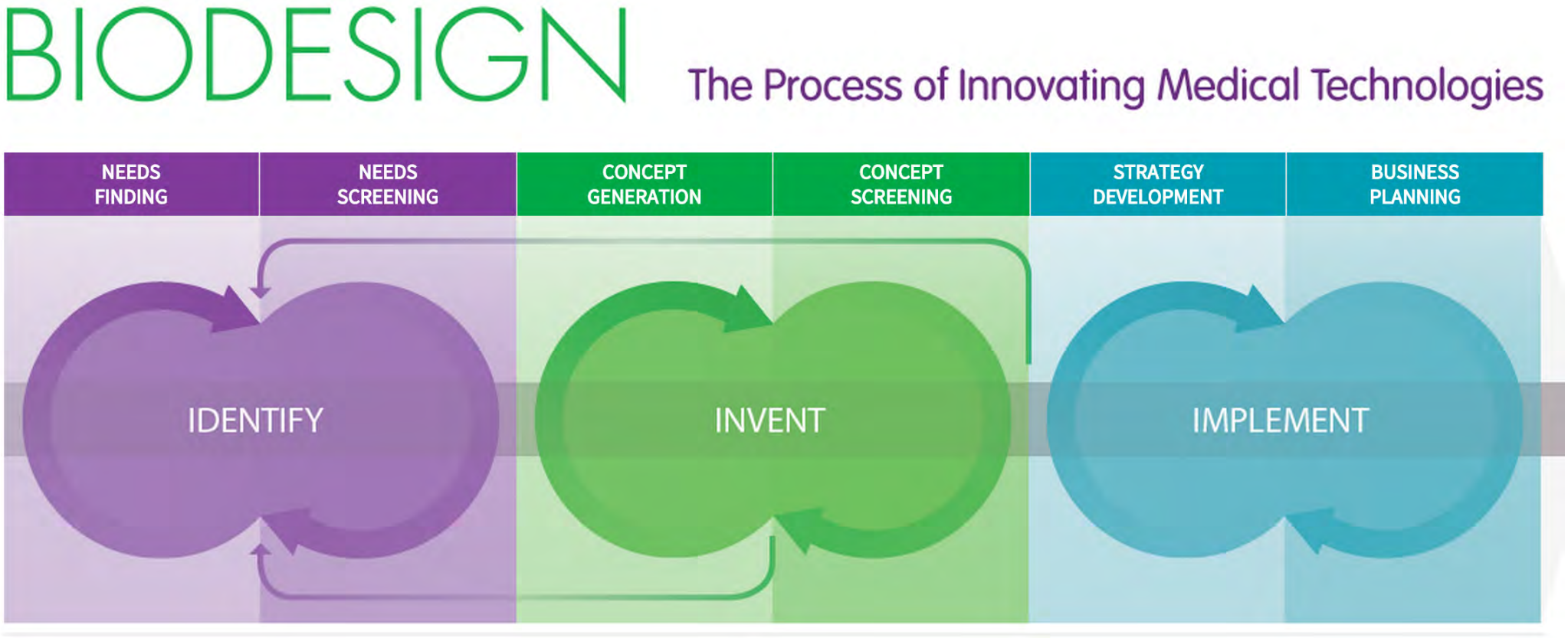
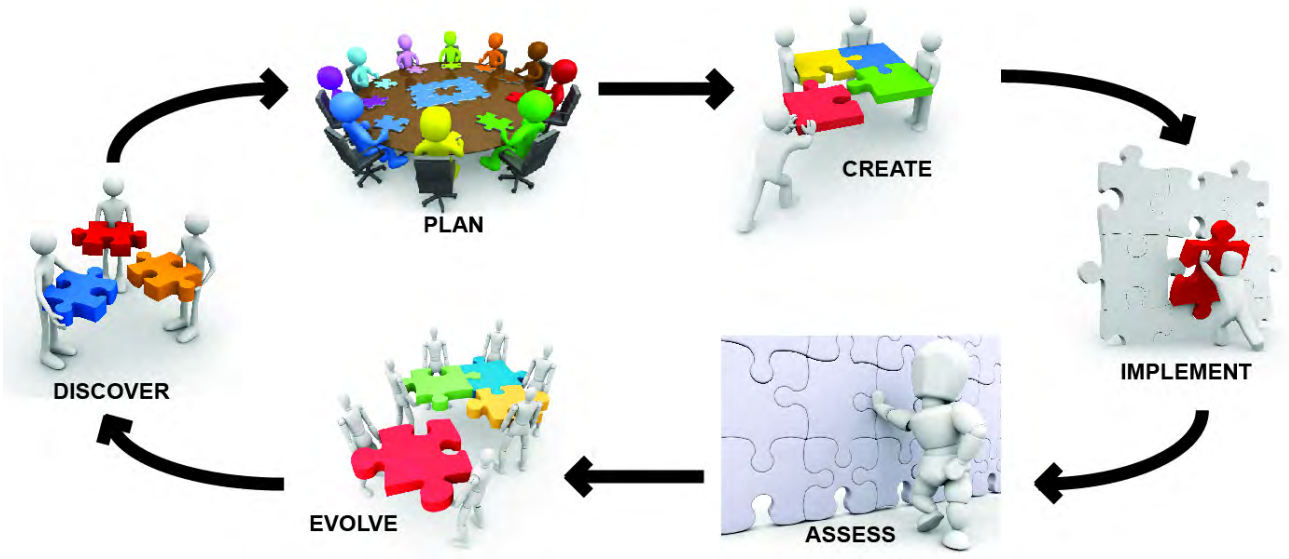
CTO: Ivan Owen [iowen@uw.edu]

The capstone sequence starts in Fall with B ME 371: 'Entrepreneurship for Engineers'



B ME 371 sets the non-technical context for Design (B ME 495) and Build (B ME 496). Design and build activities occur during B ME 371 when the project has sufficient maturity.



During Design (B ME 495) students meet weekly with Dr. Mourad to learn design principles.

They also report on progress of the design phase of their project.

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During Build (B ME 496) students meet with Dr. Mourad to learn principles of manufacturability as well as advanced business planning concepts that extend those taught in B ME 371.

They also report on progress on the build phase of their project as well as develop and practice their final presentations.

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ME Capstone project philosophy: emphasize impact and sustainability.

projects address a readily perceptible need.

senior mechanical engineering students provide leadership and mentorship to students their junior.

depth of contributions, and autonomy, of less experienced undergraduates (freshman, sophomores, juniors) increase as they invest more of their time.

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ME Capstone project philosophy: emphasize impact and sustainability.

projects likely to last more than a year.

projects benefit from if not require cross-disciplinary contributions (ME, EE, CS, Biology, etcetera)

ideally, less experienced undergraduates (freshman, sophomores, juniors) contribute in a way that gives them increased project ownership with time until they lead the project.

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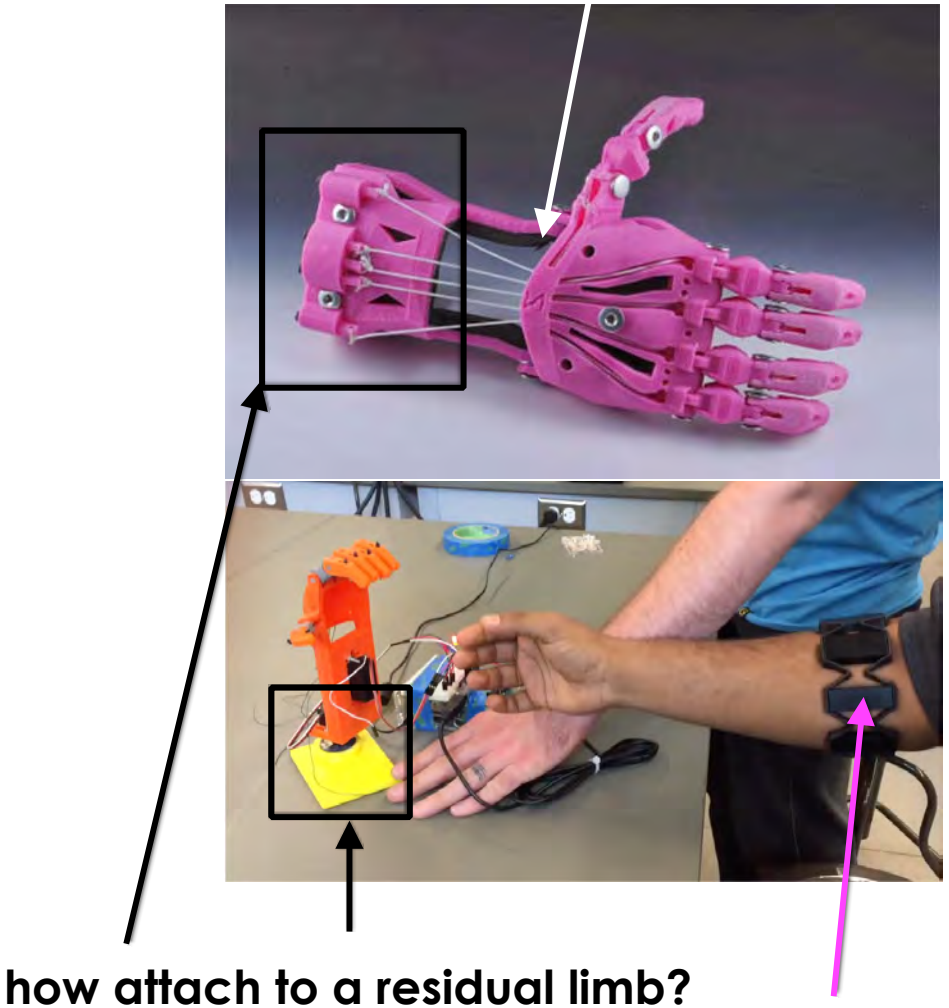
3D Printed Prosthetic Hand

Mechanical Engineering Capstone
Han Dang (hdang8792@gmail.com)
Bruno Ouattara (ouatt@uw.edu)
Adam Zhu (kaiqingzhu@gmail.com)

Electrical Engineering
Pinky Panketh (panketh@uw.edu)
Saleh Matt (saleh.matt2@gmail.com)

Computer Science
Kiran Gurajala (kgurajala@gmail.com)
Alex Lee (aelfriclee@gmail.com)

Biology
Celeste Salvo (stars5137@gmail.com)



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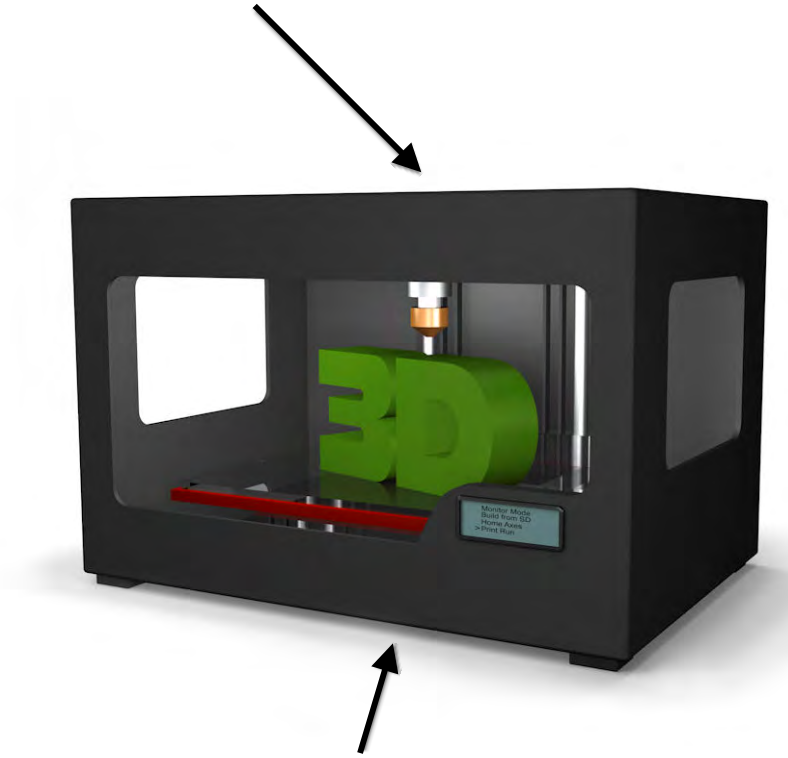
printing chocolate in three dimensions

requires fine control over temperature, extrusion rate, & humidity



experience here will inform the 3D printing of soft biomaterials

Mechanical Engineering Capstone
Luke Johnson (lukej112@uw.edu)
Jake Blurton (blurton@uw.edu)

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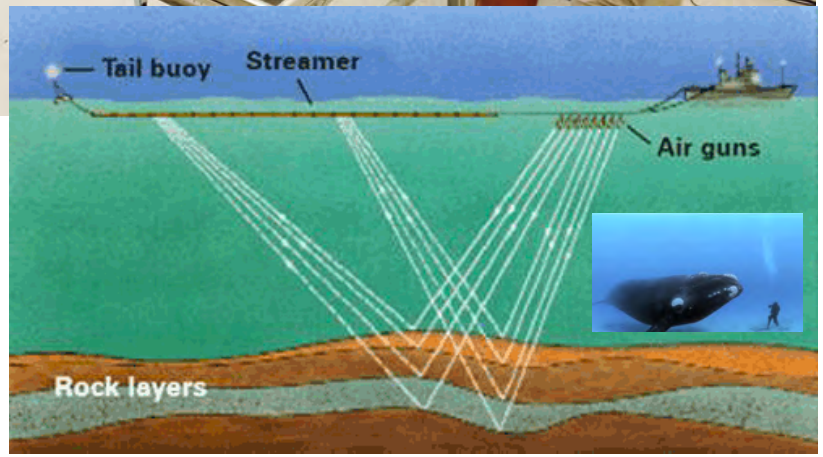
a marine device - remote controlled torpedo

Mechanical Engineering Capstone
Connor Gracia (cgracia@uw.edu)
Kara Nuno (karma6@uw.edu)
Nhan Ly (nhanly94@uw.edu)
Spenser Petherick (spenserp@uw.edu)

modify now, to tow a hydrophone
to listen to whales; design for later,
a small, remote controlled torpedo



Applied Physics Laboratory (UW)
Shima Abadi, PhD [ME Prof @ UWB]

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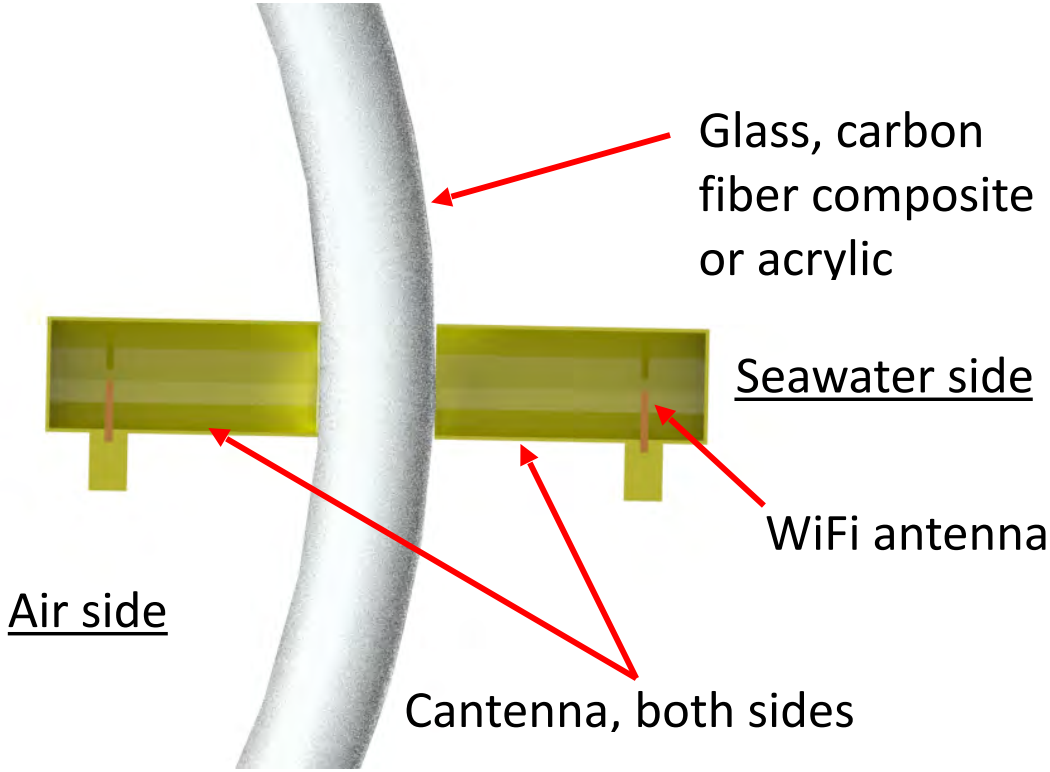
a marine device - wireless communication



Applied Physics Laboratory (UWS)
OceanGate, Inc

Mechanical Engineering Capstone
Stephen Ton (tons@uw.edu)
Eric Miller (rogeri1@uw.edu)
Zaid Alshatwi (zaid7@uw.edu)

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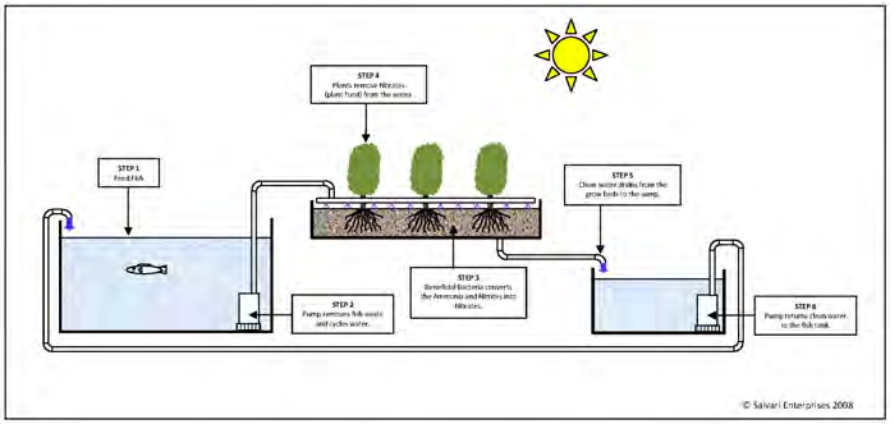
a project for the developing world

<- this powers that ->



aquaponics prototype
at Frog Farm in Woodinville

Mechanical Engineering Capstone
Johnny da Silva (jmarqs@uw.edu)
Josh Hurley (hurley33@uw.edu)
Justin Kneip (kneip@uw.edu)
Richard Yip (richardy@uw.edu)

Electrical Engineers
Trevin Jorgenson (trj6@uw.edu)

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a project for the developing world

<- this powers that ->

solar powered cooler prototype at
Sustainable Agriculture Education Collaborative

Mechanical Engineering Capstone
Robby Shaffer (ras1224@uw.edu)
Elliott Vega (vegae@uw.edu)
Luis Alvarado Cabellero (lalva131@uw.edu)
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Electrical Engineer
Manjinder Singh (msingh99@uw.edu)

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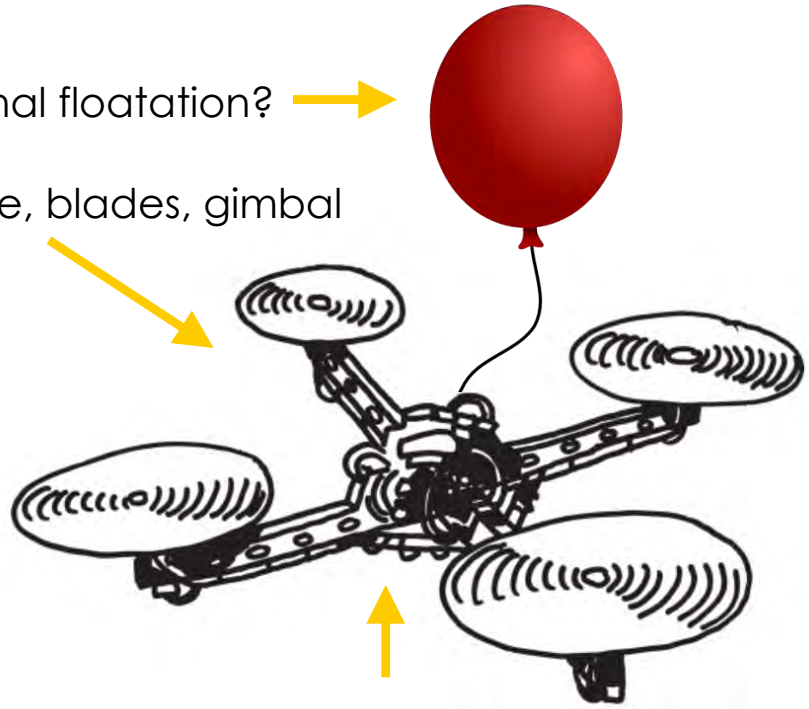
a quiet quad-copter

Quiet propellers, motors;
and other approaches?

a partnership
with Vulcan, Inc to study
african mammal
behavior



Mechanical Engineering Capstone
Kirollos Boules(kiko7650@uw.edu)
Case Isaac (csisac@uw.edu)
Minh Tran (themqt@uw.edu)
Dang Nguyen (dang92@uw.edu)

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a marine hex-copter

lands, fuels, takes off
from the ocean surface

a partnership with the
Applied Physics Laboratory

contactless power transfer
in the marine environment

Sensitive camera
(visible, IR, hyperspectral, radar)

Mechanical Engineering Capstone
John Lynch (quarks@uw.edu)
Jestoni Orcejola (jestoni@uw.edu)
Justin Proctor (proctj@uw.edu)
Youssef Elkhamri (elkhamri@uw.edu)
Pengkun Zhang (zhangpk@uw.edu)

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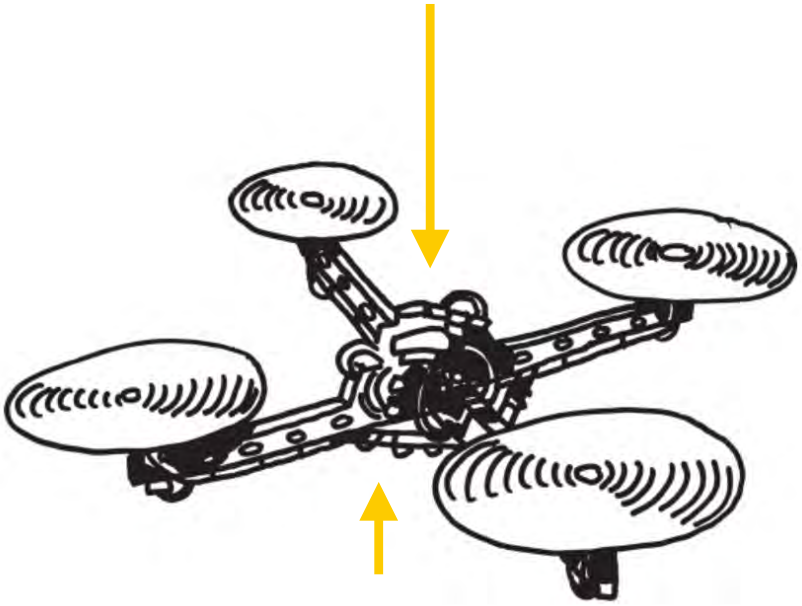
a microsoft quad-copter

includes real-time image upload and analysis via Azure, Microsoft's cloud

plants around Mt St Helens;
crow roosting dynamics



Sensitive camera
(visible, IR)

Electrical Engineering Capstone
Dong Tran (trandon08@gmail.com)
David Tan (dtan1293@gmail.com)
Toan Nguyen (tnguyen3901@gmail.com)
Virak Kong (vireakyutkong@gmail.com)

supported by ME Coptor teams

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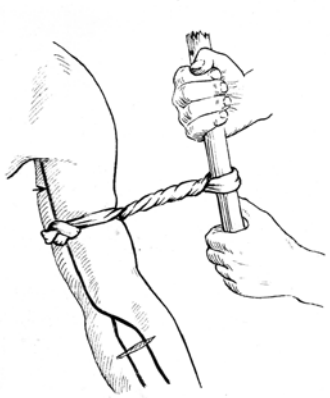
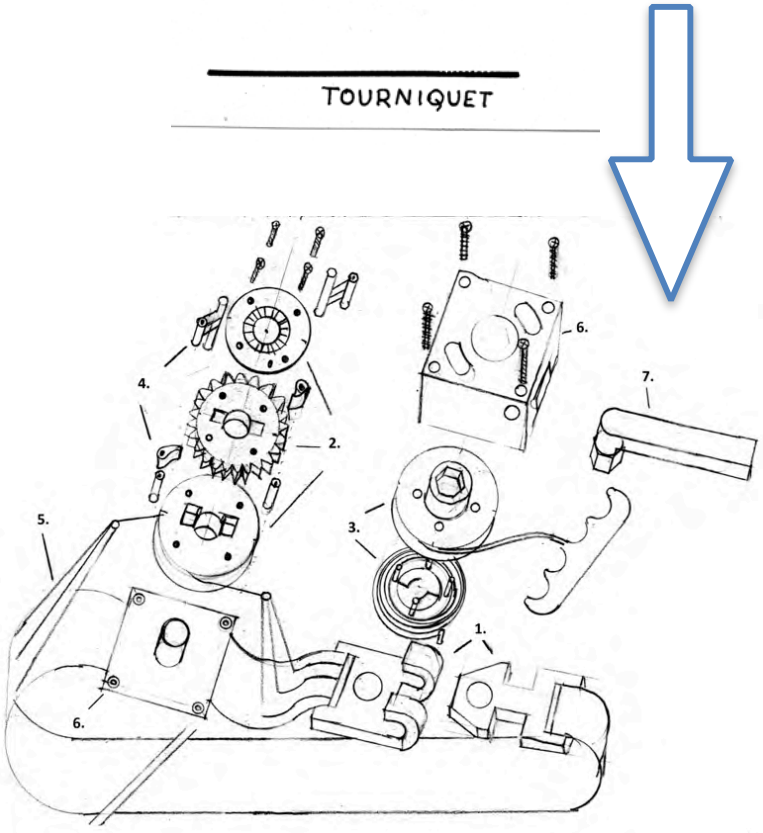
a novel tourniquet





Mechanical Engineering Capstone
Bryan McDermott (bryanm16@uw.edu)
Katy Kuznetsova (katykuz@uw.edu) (p)
Colin Huffman (hufmac@uw.edu) (p)

Electrical Engineer
Wade Bovard (wdebvrd@uw.edu)

With Devon Kim & Justin Oblu
(veterans; former B STEM 371 students)

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(p = principal project)