

IPIDAT 2005

IPIDAT Conference Center, Indian Point, ME
23 – 24 July

Minutes

Participants

Name	Affiliation	e.mail
Scott Albritton	Purdue	salbritt@purdue.edu
Amy Banzaert	MIT	amybanz@mit.edu
Christopher Bull	Brown	Christopher_W_Bull@brown.edu
Chris Carr	MIT	chrisc@mit.edu
Donna Cohn	Hampshire	dcLM@helios.hampshire.edu
Stephanie Dalquist	MIT	skd@mit.edu
Job Ebenezer	Messiah University	jebeneze@messiah.edu
Shawn Frayne	MIT	smf@mit.edu
Adam French	Stanford	afrench@stanford.edu
Bill Eger	U of Dayton	egeriicw@notes.udayton.edu
Emma Fulton	RIT	fulton_emma@yahoo.com
Barrett Hazeltine	Brown	Barrett_Hazeltine@brown.edu
Andrew Heaftiz	MIT	heaftiz@mit.edu
Molly Hegarty	U of Michigan	hegartym@umich.edu
Alison Hynd	MIT	hynd@mit.edu
Kurt Kornbluth	UC-Davis/MIT	kkorn@ucdavis.edu
Mary Ollenburger	CalTech	mary@its.caltech.edu
Linda Plano	Mass Tech. Transfer	lplano@umassp.edu
Josh Schuler	Lemelson/MIT Program	jschuler@mit.edu
Amy Smith	MIT	abs@mit.edu
Dave Wallace	MIT	drwallac@mit.edu

Action Items

- Send out past ipidat notes, annotated bibliography, etc.
- See the other future steps you can take, denoted by a 📌



Expectations

- inspiration
- learn from others
- help
- contacts / meet people
- new ideas for projects
- rejuvenation
- informal networking opportunities for inventors
- how to influence administration
- class ideas
- re-energize
- share stories and ideas

Presentation of Existing Materials & Work

Amy Smith:

D-Lab (development, design, and dissemination)

Distributed: fall term syllabus, spring term syllabus, sample projects

- 4-parts
 - In fall, class focuses on development and appropriate technology
 - Over January break, travel to the field, (7 countries last year), and get ideas for projects
 - In spring, design class focusing on appropriate technology
 - In spring, dissemination class looking at dissemination and distribution models for new technology
 - In summer, extended field trips
- 25-35 students in each class

Course Materials Library

Distributed: course materials resource packet

 *contribute new materials to this packet*

Andrew Heafitz, MIT:

Design for Demining (Landmine Removal)

- Focused solely on landmines – designing tools for deminers
 - Deminers are very conservative, very limited funding, don't like academics
 - Email Andrew for the compelling details on why demining is so important, and so difficult
 - Design very low-tech improvements (extended handles, etc.) ; pick prod developed that's now being distributed in Zambia (5,000 sold)
 - Class design is project pipeline – each class some work on new ideas, some work on older ideas, some work on finishing prototypes for blast testing
- # students: 10, 4, 6 –

 *needs help with recruiting, ideas for recruiting*

Chris Carr, MIT

- working on raising money for IDI (International Development Initiative)



- will be working in Eastern Kenya to address heating, lighting, basic science center

 *needs help with best practices*

Job Ebenezer, Messiah University

- Teaches a global sustainability, general ed course, so not solely technology, but brings up resource conservation, energy conservation, chemical alternatives. Students work on projects such as looking at lighting energy conservation – low cost and no cost solutions.
- Job has done a number of international projects working on technology for the poor. For more information, google “technology for the poor.” He’s very interested in finding projects most appropriate for poor and, hence, how to make devices have multiple, complementary functions:
 - human energy
 - designed attachment for bicycle for rice threshing, peanut shelling, pumping, lathe, so that it has transportation and more abilities; no tools required, easy to repair
 - animal energy
 - treadmill – didn’t work too well, because hard to find/use animals at college; currently, traffic jams create animal suffering, but in open agricultural area, more opportunity for
 - urban agriculture
 - developed farm right next to Ohare airport in Chicago – created urban garden from old tires, etc.; vegetables went to impoverished local community; replicated at college in India; replicated in DC where brown fields converted to gardens
 - building
 - used loose rice straw (see technology for the poor on Google), other agriculture waste as building material with Habitat for Humanity in Ecuador, more opportunities
 - solar
 - solar cooker, but can also dry fruits and pasteurize water (3-in-1 device)

Mary Ollenburger, CalTech

- transforming sole 10-week product design class (product design for developing countries) into appropriate technology/international development class, working on helping to connect students to projects, class curriculum and readings, lecture sequence
- some focus on business and marketing – need to think about role of business and product design and how it all fits together
- cross-listed between Caltech and art center design school; mostly juniors and seniors from Caltech, grad students from art center
- recommend talking to Paul Polak

 *needs help with project ideas, syllabus issues*



Molly Hegarty, U Michigan

- Engineering for Community class
 - Student & teaching team member
 - Run for 2 years
 - Usually 40 students, mostly engineering, a few anthropology people, international development people, mostly upperclassmen and grad students
 - Local and international community work
 - Women's shelter in Detroit
 - Soap-making in India
 - Dominican republic school of public health – water purification comprehensive solutions
 - Kenya – solar cookers
 - Students pick projects

👉 *needs help* : Currently trying to define focus so not spread so thin – set number of projects? Local AND international?

Emma Fulton, RIT

- Major senior design project, multi-disciplinary sequence, trying to get ideas to increase number of projects (5 students on the team)
- Got grant to work on solar ovens from EPA – won EPA P3 competition,
- More projects through the recycling center – lots of co-ops on improved recycling

👉 *needs help*: now, how to implement (multi-function oven for Venezuela and vicinity)

Amy Banzaert, MIT

Distributed project descriptions for two MIT classes

- Working on methods for introducing aspects of international service projects into the core curriculum of the mechanical engineering department.
 - 2.002, Mechanics and Materials II, a sophomore-level class, has a 3-week lab project: students worked on testing the material properties of an alternative charcoal made from agricultural waste
 - 2.006, Thermo-Fluids Engineering II, a junior-level class, has a final project, in which teams of students did the paper design and calculations for a portable distillation unit for extracting essential oils from plants, as a way for subsistence farmers to grow cash crops that help prevent erosion

Josh Schuler, Lemelson-MIT Program

Distributed InvenTeams brochure

Award and recognition group – invention prizes for mature, established inventors and student inventors

- created InvenTeams – teams of HS students (supported by math, science, tech ed teachers) come up with idea for an invention, get funding to develop prototype

👉 *needs help*: networking for inventors, more support, more interaction, interested in InvenTeams in developing countries, connect Josh with more US High schools, too



Stephanice Dalquist, MIT

- interested in how to foster businesses around appropriate technology
- working on U2U, IDI at MIT

Sean Frayne, MIT

- Working on developing technologies
 - Charcoal from agricultural waste, focused on sugarcane waste in Haiti; lots of potential for micro-enterprise, improved environmental impact
 - Inexpensive, possibly emergency water treatment through solar disinfection bags (SODIS)

Chris Bull & Barrett Hazeltine, Brown

Distributed course descriptions

Developing/teaching two classes

- Social Entrepreneurship
 - Brown wants teaching of business skills, so class proposed
 - First class will be in fall
 - Trying to figure out how to organize it, readings, etc.
 - Frustrated by number of things that go in the dumpster at the end of the semester – want projects that develop a life of their own
 - Looking for local groups to partner with to do entrepreneurship stuff
 - Desired outcome – business plans, marketing plans for what group needs

Need help to find projects

- Appropriate Technology
 - Started out as technology project for liberal arts students
 - Project-based, introduces everyone to sustainable development
 - started to find local partners to benefit from projects, struggling to find people to work with, including those overseas
 - Local oyster farmer needing power

Need outlets for student activities and finding projects

Alison Hynd, MIT

- Working on IDI
- Runs MIT IDEAS Competition (innovation, development, enterprise, action, service)

Distributed IDEAS Project Profile, IDEAS brochure

- 1/3 of team from MIT
- work on innovative projects that serve community need tried to draw in competitive people, even if less service-oriented
- really a grant process – students use award to implement project
- networking events, voluntary proposal rounds, to help students develop ideas
- 6-9 teams win awards of \$2000-\$5000 to implement project in a year, try to support them as much as possible, including a retreat at the start of the summer



- many projects fed from sustainability/appropriate technology classes at MIT, good continuation/support mechanism for these classes

need help – how to support projects that don't win but are good ideas

- IMPACT conference run for the first time this year, for Social Entrepreneurship, service, etc. competitions

needs help – more attendees

- Runs Public Service Fellowships program

Distributed Fellowships brochure

- Used to be just local, then expanded to international
- Good support mechanism for sustainable/appropriate technology classes at MIT

Bill Eger, University of Dayton

- Assistant director of ETHOS – Engineers in Technical, Humanitarian opportunities of Service Learning, student initiative started 4 years ago
- 4 parts
 - classroom projects, mostly focused on Mech E., started in Civil E. (thermo, materials, heat transfer labs); testing biomass stoves; community-based design from Civil E (water field design)
 - Internships – students travel for one semester (usu. In summer) mostly in western hemisphere, Latin America, trying to add value to community initiatives. Desalination, well design, solar panels/ovens/cookers, biomass generators; 12-15 students usually
 - Engineering Design and Appropriate technology class filters into internships – definitions, case studies, existing technology, language & travel prep
 - Collaborative research on biomass stoves, combustion testing; characterizing stoves across the world – looking at materials across the world and how they're used
 - Student club working on awareness for engineering school and university as a whole
- Deans/Chairs on board, faculty resistant, in part because departments primarily funded by DoD, less buy-in to these types of projects
- Trying to create curriculum with economics department
- Want to start appropriate technology lab
- Develop interdisciplinary course that's lab-based focused on development and innovation
- Trying to influence growing product design curriculum tracks
- Trying to influence design competition

Adam French, Stanford

- Fellow at D-school, institute in design
- D-school
 - Institute for multidisciplinary design education– business, technology, humans



- ME206 – Entrepreneurial design for extreme affordability
 - Name is business-student oriented, because hardest to recruit
 - Traveling to Cambodia, Bangladesh, Myanmar to identify hot topics to work on
 - Previously working with Light up the world and David Irvine Halliday, on lighting, now IDE and Paul Polak on agriculture

Kurt Kornbluth, UC-Davis/MIT

- Help teach D-Lab
- Interested in developing class on existing technologies that are good to learn about

 would like input on this sort of class

- U2U – University to University
 - Students from different universities, many different disciplines, all work in a village together – working with Harvard Med students, MIT students, UC Davis, Rutgers med school, University of Zambia; difficult to coordinate schedules
 - Looking to incorporate into MIT curriculum
 - Hope to work with communities using this model: work with one organization for many years, let it grow organically, return every year, but reduce level of input
- Another pilot project -- Biomass sterling engines with Iqbal Quadir and DEKA
 - Dung in, dung out
 - Economic model challenges

Linda Plano, Mass Technology Transfer Center

- Clean energy venture forum and competition
- Sustainability a harder sell for business people, standard practices not successful, but for sustainability, need to be financially sustainable

 wants to discuss and find good projects to market

Donna Cohn, Hampshire College

- Students create their own majors
- Work at Lemelson Assistive Technology Development Center (LATDC);
 - Starting to work on appropriate technology
 - Mix of students
 - Want students to learn about appropriate technology by making things, not necessarily innovative
 - Focused on pedal-power most recently
 - Worked with Ralf Hotchkiss from Whirlwind wheelchair international
 - Good fabrication shop – lots of low tech, nice for appropriate technology

Scott Albritton, Purdue

- Interested in developing a database of existing appropriate technology solutions



Working Group Brainstorming Session

- Dissemination
 - What would a class on this look like
 - Methodologies
 - Follow-up
- Social entrepreneurship
 - What is this? Define
- Business side of appropriate technology
 - Economic development in MA in the context of social enterprise
- Projects and contacts
- Clearinghouse of projects and people wanting to work on it
 - how to become the “google” of this
 - need feedback mechanisms, critical, searchable
 - keep it manageable for the community partner – not overwhelmed
 - updatable, usable
- Incorporating non-academic groups
- 10-minute knowledge-sharing: “I need ...”
- Mechanisms for follow-up for student projects
- Working effectively with community partners
 - Measuring effectiveness
- Using institutions for continuity
- Continued involvement for people not necessarily for career
- Professional summer-long course for teaching how to teach development
- Student conference
 - Maybe build on existing workshops:
 - ESW, EWB, homelessness and poverty
 - Maybe create one that’s clearly differentiated
 - Inter-institutional experience
 - Multi-disciplinary may be worthwhile – social science,
- Role of women in development
- Curriculum & Course materials topics
 - Lecture on lifecycle analysis on appropriate technology classes vs. local work
 - Teaching humility, empathy
- Rebranding of what we’re trying to do
 - Appropriate technology, sustainable development, social entrepreneurship
 - Definitions, impact of current language
- Preventing “expert amateurs”
- Incorporating into institutional infrastructure: Successful interdepartmental work in a silo’d world
- Credibility
- Teaching students to be change agents in their own communities
- How to develop an interdisciplinary class
 - Defining real needs for interdisciplinary skill sets



- Rebranding/getting the right people involved
- Working with UN, WorldBank, IMF
- Benchmark biomedical engineering, other new disciplines, how they created them
 - Goal – need to have a major in appropriate technology to be a first-class university
- Fostering relationships within university
- Interacting with (or not) multi-national corporations, WorldBank, NSF, professional societies, NAE, USAID, etc.
- Central fundraising and database places
- Sustainable technologies for USA, our local communities, our institutions
- Open-source patents / IP issues
- Distribution issues
- Teaching humility & empathy
 - From a distance?
 - Still maintaining excitement
- Good resources on pedal power
- Sharing speakers – speaker circuit
- IPIDAT website – Shawn, Scott
- Future of IPIDAT
 - Journal?
- What are the most appropriate appropriate technologies – solar cookers, grain mills, etc. etc. etc., and which failed and why; need to learn from failure
- Failure – acceptable/beneficial in academia, brutal to community partners
 - Journal? Textbook or something (well-documented)? Also verified successes, and follow-up on projects you hear about
- Accountability
 - Concrete feedback
 - Students and professors
 - Long-term follow-through
 - Good evaluation mechanisms for impact (assessment)
 - Database – like ebay/amazon reviews
 - Inter-university critiques of projects
 - User manual usability/understandability
 - Working at the same location repeatedly

[Presentation of Working Sessions](#)

Clearinghouse for Projects

- Place for documenting the projects we're doing for appropriate technology, searchable, comment-able, revisable
 - Documents prior art in a central place
 - Place for ideas that haven't been worked on, too
 - Could use unsuccessful searches as a good opportunity for ideas and more content development
 - Ranking of designs, people using the site,



- Importance
 - maturity
- Feedback that's anonymous (with an alias) or, for more impact, as yourself
- Failure stories – how and why projects failed
- Index of related work – people who like A also like B
- Help choosing between different similar projects for a given context
- Seals of approval (IPIDAT, D-LAB, IDE, ITDG, etc.)
- Branding – the database needs a catchy name
- Developing critical mass
 - Begging
 - Consortium
 - Being awesome
 - marketing once it's great
- Clear IP policy
- Resources
 - Grad students and others
 - Funding
 - Opportunities for subscription system for teaching tool access (sliding scales)
 - Foundations
 - Individual user donations
 - Click-through advertising/pop-up ads./ google-like filtered searches Etc. possible, but would like to avoid
- Balance between high-bandwidth, high-content access in US et al, and low-bandwidth, dialup-able

Next Steps

- Survey to find out what people would find useful (Scott & Amy)
- Invite librarians (Amy B)
- Create community of alpha-users/testers (IPIDAT)
- Build consortium via MIT TLO (David & Amy)
 - Universities & NGOs
- Coordinate pilot test (Alison)

Dissemination – Extreme DFD (design for dissemination) – getting some hardcore ROI from the BOP *sucka*

- Syllabus
 - Case study (why you must be in this class)
 - AT dissemination background info, history, definitions
 - Critical evaluation of case study including organization and technology
 - Tech briefs of mature technology – plan for dissemination
 - Dissemination models
 - Overview (scale, exit strategy)
 - Case studies
 - Is it worth doing?



- Ethics
 - User needs
 - Lifecycle analysis (cost, suffering, CO2, any impacts/benefits/drawbacks vs. do nothing, current scenario)
 - Feasibility study
 - How to write a business plan
 - Dissemination plan
 - Uh, what is this
 - Investment/revenue/IP
 - DFD
 - Evaluation
 - Mechanics of distribution
 - Ex – 1st week in country, what are you going to do
 - Maintainability
 - infrastructure
 - Pitching your plan -- practical session
 - Guest speaker
 - Evaluation/assessment
 - Presentation
 - Pitches to investors, NGOs
- Class details
 - Students learn about projects early on, work on it throughout entire class, may or may not implement, depending on viability
 - Great to have interdisciplinary teams, including business people, engineers, scientists, etc.
- Case studies
 - IDE Treadle pump on IDE website
 - Population service international from Harvard Med
 - Mastering the machine revisited – new roofing materials in Africa
 - MIT has made some
 - T-shirt travels video
 - ITDG smoke killer in the kitchen
 - UNDP “water for people”
 - Low cost eyeglass lenses (DFD) by Saul Griffith
- Possible technologies
 - PV
 - Treadle pump
 - Biomass cookstoves
 - Susan Murcott’s water filtration (@ MIT)
 - Zimbabwe latrines
 - IDE drip kit
 - Pot in a pot
 - SEVA eyeglasses
 - Whirlwind wheelchairs
 - Grameen phone



- Demining tools
- Bicycle ambulance
- Guest speakers
 - Paul Polak IDE
 - Iqbal Quadir – Grameen Phone
 - Ralf Hotchkiss – Whirlwind
 - David Green – SEVA
 - Dude – Halopure
 - CK Prahalad Bottom of Pyramid
 - Kofi
 - UNDP Ashoka
 - Moon & Fischer Approtec
 - Lemelson Foundation

 **Next Steps – PLEASE SHARE via Kurt Kornbluth & Amy S**

- Develop course materials, success/failure stories
- Find more social entrepreneurs
- More case studies
- Extend list of proven technologies
- How to market the class
- More speakers, including a speaker circuit w/ other universities
- Identify similar classes at other universities

Sustainable technologies for local communities

- Topic areas
 - Energy
 - Transportation
 - Gardening
- Compelling reasons to do a local development project
 - Logistics
 - Adds credibility
 - Test case for international work, practice, team-building
 - To the institution
 -
 - Experiential learning
 - Accessible communities/users
 - Easier to evaluate/measure results
 - Users
 - Grading
 - Close by
 - Availability of resources
 - Multiply effectiveness through advocacy
 - City hall is a whole lot closer/easier to access
 - Students can be agents for change in their own community
 - Maintain continuity
 - We are members of the community



- More embarrassing if failure, in some ways
 - Easier to have samples /experience available – “live & tell”
 - Fewer language barriers
 - Fewer cultural barriers
 - Opportunity to leave ivory tower
- Easy to show
 - High visibility and usability
- High follow-on potential
- High expectations/incentive to be successful leads to rich experience
- Easier to test during the development
- Regular community contact, rather than intermittent
- Parallels international development
- Impact/payback analysis – local vs. international
 - Plane tickets hurt budget
- How to make it sexy
 - Integrate it into international projects as step one to gain experience

Faculty training program for international development experience

- Focused project, get your hands dirty
- Need to achieve attitude adjustment for participants
 - Learning from community
 - Participatory methods/teaching
 - listening
- similar to leading a student trip
- timeline – one month
 - integrating research, family, curriculum development, networking/collaboration
- urban & rural exposure
- visiting manufacturing and materials sites, marketplaces, failed projects, pit latrines and use them, very successful local NGOs without university help
- language training
- former collaborations with local universities
- experience “lifestyle”
- careful not to overwhelm community
 - stereotype development
- site with abundant potential partners, or many sites
- widely applicable / expandable projects
- understanding the need for continuity, commitment
- focus on affordability
 - what does it take
 - help finding what it takes
- integrating reflection
 - experiences and how to integrate
- quality of life/values
- questioning assumptions



- looking beyond differences
- exploration of objectives
- cultural and safety issues – real and perceptions
- liability issues
 - MIT has a sample that might be helpful – contact Alison
 - Parents issues
- NSF did workshops that seem somewhat similar – builds Dean credibility
- Could do some of this locally, even as commuter school
- One month in field != expert development worker

The “I need ... I know” (INIK) session

- Updated e-mails: Emma: fulton_emma@yahoo.com, Andrew: heafitz@mit.edu
- Solar cooker brochures for Emma
- Mary – projects and contacts for fall class, possibly in central America
 - 10-week term
 - type of students, etc?
- Donna – curriculum library examples – on D-lab website by end of summer: web.mit.edu/d-lab (curriculum materials link)
- Amy S – curriculum materials you’ve developed
- Andrew – how to assign students to teams & projects
 - David sez: randomly assigning teams before project selection is very effective – better team balance, good pedagogical experience to work with different people, on different projects. Having projects after teams are formed, but students can pick from a list or develop their own; random assignment works for teams as small as 3-4
 - Emma sez: students act as team leader, spearhead project, and then meet possible teammates, and then both sides rank and get matched
 - Amy S sez: students signed up for different projects, but then TAs traded for ideal skill sets (listed on form)
 - Scheduling team meetings challenging w/ random assignment
 - Avoid fraternity selection syndrome w/ groups of friends
 - Design decision-making can be affected
- Andrew – working on multiple projects or just one

The Future of IPIDAT

- People want to do it again
- Technology fair
 - Especially an edible technology fair
 - “the sustainable banquet”
- Hopefully be able to talk about developments in new classes, how curriculum have gone, how U2U has started
- First day – an hour of what happened with last year’s efforts
- IPIDAT Journal to publish results – would help with growth



- Burden or benefit?
- Could help with university adoption, more recognition
- Could start with established journals, then develop specialized if needed
 - Bulletin of science, technology, and society
 - Journal of Physics Technology
 - IIE solutions
 - Journal of Engineering Education (ASEE)
 - Frontiers in Education conference
 - NCIIA conference
- Size
 - Size is nice, not overwhelming, lots of work completed
 - Probably could do 25
 - Plenty of existing, huge conferences
- Timing
 - Need to consider house availability
- Repeat attendees vs. new people
- Grad students and instructors
 - Not many practitioners (NGO people, etc.)
 - Not many faculty
- Length
 - Hands-on case studies would take more time
 - Thurs, Fri, Sat. – possible to fly in early explicit
- Multiple discussion sessions good
- Better carpooling
- Mix of small group and whole group work
- Bigger possibility to undertake
 - Database consortium a good start
 - Conference proceedings would be useful
 - Also syllabi, reading lists, etc.

👉 Suggest others to invite

👉 Bios (Alison will nag and collect)

