CE 4011/5570: Design for Sustainable Development: Discovery, Bangalore, India

May Term 2014: May 18 – June 9, 2014

3 Credits

Instructors:

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Course Description:

Problem description
While populations in developed nations benefit from widespread modern infrastructure, access to reliable infrastructure services remains limited in developing nations. Rapidly urbanizing populations growing in size and affluence often do not own and cannot access the infrastructure required for a healthy, safe, and productive life. Urban and rural population growth often is not accompanied by commensurate development of transportation, housing, water supply, wastewater, solid waste, and energy systems. The resulting technical challenges are enormous. For instance, electricity is often unreliable, leading residential and commercial establishments install a patchwork of private back-up diesel generators. Women may wait in long lines for over-priced water from private water purveyors because water infrastructure or sufficient supply does not reach their homes. Aging sewage pipelines remain broken because the wastewater utility cannot recover its operational costs under financial tariff structures. Low-income communities are especially excluded from access to reliable public services. Because realizing access to efficient, affordable, and safe products and services is necessary to improve public health and livelihoods, professionals from various disciplines can take an important role in supporting creation of impactful technologies and services in developing societies to address societal and environmental challenges while generating revenue.
Course description
In May 2014, the University of Minnesota will lead students on a pathway of exploration in CE4011/5570: Design for Sustainable Development: Discovery. This three-week course will introduce students to engineering and social entrepreneurial aspects of urban and rural development in Bangalore, India. Through guest lectures, field visits and workshops, students will investigate the role of engineers and designers in achieving sustainable access to products and services through social entrepreneurial approaches. By the end of the course students will have an appreciation for infrastructure and other engineering challenges of urban and rural development, and for how effective sustainable technical solutions must fit within a broader socio-economic context.

This class is open to upper-level undergraduates (students with advanced standing - juniors or seniors - with a minimum 3.0 GPA) and graduate students at the University of Minnesota. The class will have four pre-departure meetings in Minnesota. The program will occur in Bangalore, India, during May 18, 2014 to June 9, 2014, including travel time.

Course Objectives
To explore development, environment, engineering, and infrastructure issues in India, with a focus on:
- Issues, challenges, and solutions in urban and rural Indian communities.
- How communities can effectively participate in the design and management of products and services.
- Ways in which infrastructure engineering in India differs from in the United States.

To explore the role of business and technology in creating effective approaches to provision of technologies and services in India including:
- Principles of and approaches to sustainable development (top-down and bottom-up).
- Roles of institutions (government, NGOs, business) in sustainable development.
- Roles of engineers, designers, entrepreneurs, and appropriate technology in sustainable development to improve living conditions.
- Successes and failures in the use of technology and business to support development.
- How engineers and entrepreneurs create ventures to address social and environmental challenges in India.
- How to develop and communicate business models to address development challenges in India.

Educational Objectives:
The course is designed so students will demonstrate the following:
- Global awareness of social, economic, and technical challenges in developing societies.
- Inter-cultural and interdisciplinary skills, including communication.
- Understanding of professional and ethical responsibility.
- Understanding of international and sustainable development.
- Understanding the role of entrepreneurs and engineers in sustainable development.
- Understanding of how to create effective market-based approaches to development challenges.
- Understanding of how and why infrastructure and other engineered systems in India are designed and operated differently than in the United States.

Teaching Methods:
- In-class presentations by invited experts, including researchers and practitioners from non-governmental organizations, businesses, entrepreneurial groups, government, and academia.
- Field visits to communities and project sites in and around Bangalore.
- Readings on engineering, business, and society in India.
- In-class discussions & student presentations.

Credits and Workload Expectations:
Design for Sustainable Development: Discovery is an intensive three-credit field course. Expect to spend 25-30 hours before the class starts for pre-departure meetings, required reading, and travel preparation. Expect 8 or more hours per day in course-related activities while in India.
Grading:

The overall course grade is comprised of participation (30%) and assignments (70%).

Assignments:

For all students:

- **Assignment 1 - Due at meeting 2 – 4/1/14**: Read Behind the Beautiful Forevers. Write a 1-page summary of the book using the What, So What, Now What reflection method in Appendix B. Summary to be handed in on paper at meeting 2 (4/1/14). Be prepared to discuss your summary in meeting 2.
- **Assignment 2 - Due at meeting 3 – 4/24/14**: Select a social venture addressing a social or environmental challenge in India. A list of venture options will be provided in the class dropbox folder. Write a brief summary of your venture’s business model, to be handed in on paper at meeting 3 (4/24/14). The summary should include a description of the venture using the criteria in Appendix A: Venture Model Review Guideline. Be prepared to discuss your summary in meeting 3.
- **Assignment 3 - Due in India – 5/20/14**: Purchase and read one of the following books about India: (1) Maximum City by Suketu Mehta, (2) White Tiger by Aravind Adiga, (3) The Red Carpet by Lavanya Sankaran (4) In Spite of the Gods by Edward Luce, (5) Shantaram by Gregory David Roberts, (6) India Calling by Anand Giridharadas. Write a 1-page summary using What, So What, Now What, to be submitted on paper or by email once in India (5/20/14). Be prepared to discuss your book summary.
- **Assignment 4 - Due in India – Rolling**: Two photo-blog entries per student on issues of their choice, to be posted on the course blog. Guidelines and dates for blog posting will be discussed pre-departure. See Appendix B for helpful questions to guide reflection.
- **Assignment 5 – Due 6/8/14**: Daily journal documenting experiences and observations (200 words/day). The journal will be due by 6pm Sunday 6/8/14 by email to Brian. That deadline is firm. You may submit the journal earlier if you wish.
- **Assignment 6 – Short readings – Rolling**: To be provided during the course in India.
- **Assignment 7 – Two-minute venture pitch at Summer Institute**: Students will develop a short presentation on a venture solution during the last week of the course.

For all graduate students:

- **Assignment 8 - Due by 6/8/14 – A venture summary covering the student’s venture idea from the Summer Institute. The venture summary should address criteria in Appendix A.**
  - This report is required for all graduate students (enrolled in CE 5570). The specific venture idea will be developed via discussions with the faculty while in India.
  - While in India students will submit the venture idea for their report. The final summary will be due by 6pm Sunday 6/8/14 by email to Brian.

For all undergraduate students seeking CSE technical elective credit:

- **Assignment 8 - Due by 6/8/14 – A problem set focused on environmental engineering problems observed during the class in India and common in many developing nations.**
  - This technical assignment is required for all undergraduate CSE students (CE 4011) seeking technical elective credit. In the assignment students will be given a problem set of 6 environmental engineering questions relevant to the developing country context.
  - The technical assignment will be due by 6pm Sunday 6/8/14 by email to Brian.
### Pre-Departure Course Meetings

<table>
<thead>
<tr>
<th>Meeting 1 – Course introduction</th>
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<tr>
<td><strong>Tuesday, March 11, 2014 @ 18:00-20:00 in Lind 105 (dinner included)</strong></td>
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**Key Questions:**
- What is Design for Sustainable Development: Discovery? What are the course objectives?

**Activities:**
- **Course intro:** Introductions, review course overview, etc.
- **Logistics preparation:** We will review next steps to prepare for India.
- **Book distribution:** Students will receive a copy of Behind the Beautiful Forevers to read.

**Assignments:**
- **Assignment 1 - Due at meeting 2 – 4/1/14:** Read Behind the Beautiful Forevers. Write a 1-page summary of the book using the What, So What, Now What reflection method in Appendix B. Summary to be handed in on paper at meeting 2 (4/1/14). Be prepared to discuss your summary in meeting 2.

<table>
<thead>
<tr>
<th>Meeting 2 – Quality of life in India</th>
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<tr>
<td><strong>Tuesday, April 1, 2014 @ 18:00-20:00 in ME 3125</strong></td>
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**Key Questions:**
- What did we learn in Behind the Beautiful Forevers? How does quality of life differ?

**Activities:**
- **Discussion:** Behind the Beautiful Forevers review. Discussion of book summaries.
- **World quality of life quiz:** Test assumptions of quality of life indicators in several countries.
- **Review course outline:** A course outline will be provided detailing activities in India.

**Assignments:**
- **Assignment 2 - Due at meeting 3 – 4/24/14:** Select a social venture addressing a social or environmental challenge in India. A list of venture options will be provided in the class dropbox folder. Write a brief summary of your venture’s business model, to be handed in on paper at meeting 3 (4/24/14). The summary should include a description of the venture using the criteria in Appendix A: Venture Model Review Guideline. Be prepared to discuss your summary in meeting 3.

<table>
<thead>
<tr>
<th>Meeting 3 – Intro to impact entrepreneurship</th>
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<tr>
<td><strong>Thursday, April 24, 2014 @ 18:00-20:00 ME 3125</strong></td>
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**Key Questions:**
- What is impact entrepreneurship? What is the role of impact entrepreneurship in addressing grand challenges?

**Activities:**
- **Discussion:** Impact venture model assignment review.
- **Asia country quiz:** Test knowledge of geography of countries in Asia.
- **Blog guidance:** CSE Dean’s office communications team will brief us on blog use and etiquette.

**Assignments:**
- **Assignment 3 - Due in India – 5/20/14:** Purchase and read one of the following books about India: (1) Maximum City by Suketu Mehta, (2) White Tiger by Aravind Adiga, (3) The Red Carpet by Lavanya Sankaran (4) In Spite of the Gods by Edward Luce, (5) Shantaram by Gregory David Roberts, (6) India Calling by Anand Giridharadas. Write a 1-page summary using What, So What, Now What, to be submitted on paper or by email once in India (5/20/14). Be prepared to discuss your book summary.

<table>
<thead>
<tr>
<th>Meeting 4 – Final India preparations</th>
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<td><strong>Tuesday, May 6 @ 18:00-20:00 in Lind 105 (dinner included)</strong></td>
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**Key Questions:**
- Why are you here? What hopes and questions do you have? What are behavior expectations?

**Activities:**
- **Discussion:** Discuss hopes and questions for the trip.
- **Expected behavior:** Discuss behavior expectations for the course.
- **Logistics:** Follow up with final logistics issues (i.e. visas, vaccinations, finance, etc.)
## India Outline

### Sunday, May 18, 2014: Group Flight Departs Minneapolis, USA
Meet (2:40 p.m.) at the Delta Air Lines group check-in counter, lower T level (tram level), Minneapolis-St. Paul International Airport, Terminal 1-Lindbergh, for departure (5:10 p.m.) on Delta Air Lines flight DL #171 for Paris; non-stop Airbus 332 service with dinner served en route.

### Monday, May 19, 2014: Group Flight Arrives Bangalore, India
Arrive (08.35) Paris Charles de Gaulle Airport and proceed to connecting departure (10.40) on Air France flight DL #8461 to Bangalore; non-stop Airbus 332 service with meals served en route. Arrive (23.50) Bengaluru International Airport, and transfer by Toyota Innova Vans, with local assistant, to **HOTEL MONARCH**.

### Tuesday, May 20, 2014: Orientation, Bangalore City Tour
9:00-10:00: Breakfast, orientation at Monarch Hotel  
10:00-16:00 City tour of Bangalore including visits to Lal Bagh, Bull Temple, Commercial Street, and drive past Vidhana Soudha, the Government Secretariat. Lunch on own at Food Street (Thindi Beedhi).  
16:00-19:00: Free  
19:00-20:00: Welcome group dinner Monarch Hotel

### Wednesday, May 21, 2014: Bangalore Exploration with IIHS
8:00-9:00: Breakfast at Monarch Hotel, transport to IIHS  
9:00-10:00: IIHS introduction to urban development, water and transportation in Bangalore  
10:00-13:00: Bangalore exploration / transportation activity  
13:00-14:00: Lunch in Bangalore City Centre  
14:00-18:00: Green Power Systems solid waste / renewable energy field visit to Akshaya Patra facility

### Thursday, May 22, 2014: Solid Waste Trash Trail with Saahas
6:30-7:30: Early snack/tea at Monarch Hotel, transport to Lakkasandra  
7:30-9:00 Lakkasandra (near Dairy Circle), waste collection site  
9:00-10:00: Breakfast in the field  
10:00-11:00: Lakkasandra dry waste collection centre and Kasa Rasa in Koramangala 5th Block  
11:00-13:00: Lakshmipura on Bannerghatta Road  
13:00-14:00: Lunch in the field  
14:00-15:00: Nayandahalli on Mysore Road  
15:00-16:30: Waste aggregation site at Jolli Mohalla near city market  
16:30-18:00: Trash trail wrap up

### Friday, May 23, 2014: Energy with SELCO
8:00-9:30: Breakfast at Monarch Hotel, transport to SELCO  
9:30-10:30: Energy access in India and introduction to SELCO India  
10:30-11:30: SELCO Foundation and Rural, Tech, Policy, Tribal issues  
11:30-12:30: Urban Community Labs  
12:30-13:00: Introduction to field visit  
13:00-14:00: Lunch at nearby restaurant  
14:00-18:00: Community field visit (Kundanahalli gate, Belandur and Thannisandra)  
18:00-20:00: Reflection, brainstorming

### Saturday, May 24, 2014: Mysore Cultural Excursion
7:00-8:00: Breakfast at Monarch Hotel  
8:00-13:00: Drive to Mysore with visit to Somnathpur Temple (4-5 hrs)  
13:00-14:00: Check in and lunch at Hotel Sandesh  
14:00-19:00: Visit Mysore Palace, Gothic St. Philomena’s Church, Brindhaven Gardens  
19:00: Group dinner at Hotel Sandesh
### Sunday, May 25, 2014: Coorg Outdoor Excursion

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<tr>
<td>8:00-9:00</td>
<td>Breakfast at Hotel Sandesh</td>
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<tr>
<td>9:00-12:00</td>
<td>Morning drive (2-3 hours) to Coorg. Check in at Hotel Coorg International</td>
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<tr>
<td>12:00-19:00</td>
<td>Outdoor activities in Coorg</td>
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<td>19:00</td>
<td>Group dinner at Hotel Coorg International</td>
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### Monday, May 26, 2014: Bangalore Return / Free

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<tr>
<td>8:00-9:00</td>
<td>Breakfast at Hotel Coorg International</td>
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<tr>
<td>9:00-17:00</td>
<td>Drive to Bangalore (7-8 hours). Check in at Hotel Monarch.</td>
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### Tuesday, May 27, 2014: Ugly Indian Spot Fix, Community Visit

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<th>Time</th>
<th>Activity</th>
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<tr>
<td>6:00-7:00</td>
<td>Early snack/tea at Monarch Hotel, transport to spot fix site</td>
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<tr>
<td>7:00-10:00</td>
<td>Local spot fix with Ugly Indian</td>
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<td>10:00-11:00</td>
<td>Brunch</td>
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<tr>
<td>11:00-19:00</td>
<td>Community field visit (TBD)</td>
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### Wednesday, May 28, 2014: Rural Livelihoods and Technology with TIDE

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<th>Activity</th>
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<tr>
<td>7:00-10:30</td>
<td>Transport to TIDE’s Women’s Technology Park with breakfast in route</td>
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<td>10:30-13:00</td>
<td>Introduction to TIDE and WTP walking tour</td>
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<td>13:00-14:00</td>
<td>Lunch at WTP</td>
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<td>14:00-15:00</td>
<td>Introduction to Manini food drying enterprise</td>
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<tr>
<td>15:00-17:00</td>
<td>Discussion and reflection</td>
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<td>17:00-20:00</td>
<td>Return to Bangalore</td>
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### Thursday, May 29, 2014: Water with Biome

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<th>Time</th>
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<td>8:00-9:30</td>
<td>Breakfast at Monarch Hotel, transport to Rainbow Drive</td>
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<tr>
<td>9:30-10:00</td>
<td>Introduction to water issues in Bangalore with Biome at Rainbow Drive</td>
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<td>10:00-13:00</td>
<td>Sustainable water management - Rainbow drive field visit</td>
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<tr>
<td>13:00-14:00</td>
<td>Lunch at local restaurant</td>
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<tr>
<td>14:00-18:00</td>
<td>Community water issues – low income community field visit</td>
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### Friday, May 30, 2014: Public Health with Sankara, Intro to Social Venture Design at IIHS

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<tr>
<td>7:00-9:00</td>
<td>Breakfast at Monarch Hotel, transport to Sankara</td>
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<tr>
<td>9:00-13:00</td>
<td>Sankara Eye Hospital visit</td>
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<tr>
<td>13:00-14:00</td>
<td>Lunch at Sankara Eye Hospital</td>
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<tr>
<td>14:00-18:00</td>
<td>Introduction to social venture design at IIHS</td>
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<tr>
<td>18:00-20:00</td>
<td>Malleshwaram market walk and group dinner at local restaurant</td>
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### Saturday, May 31, 2014: Rural development and Organic Farming with Navadarshanam

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<th>Time</th>
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<tr>
<td>6:30-8:30</td>
<td>Early snack/tea at Monarch Hotel, transport to Navadarshanam</td>
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<tr>
<td>8:30-9:00</td>
<td>Breakfast at Navadarshanam</td>
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<tr>
<td>9:00-11:00</td>
<td>Introduction to Navadarshanam, group meditation</td>
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<tr>
<td>11:00-13:00</td>
<td>Challenges of rural India</td>
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<td>13:00-14:00</td>
<td>Lunch at Navadarshanam</td>
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<td>14:00-16:30</td>
<td>Village visit, rural entrepreneurship reflection</td>
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<td>16:30-18:00</td>
<td>Return to Monarch</td>
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### Sunday, June 1, 2014: Free / Summer Institute Day 1: Introduction

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<th>Time</th>
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<tr>
<td>8:00-9:00</td>
<td>Breakfast at Monarch Hotel</td>
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<tr>
<td>9:00-16:00</td>
<td>Free (Monarch check out, Green Path check in)</td>
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<tr>
<td>16:00-19:00</td>
<td>Introduction to Summer Institute</td>
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<td>19:00-21:00</td>
<td>Group dinner</td>
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### Monday, June 2, 2014: Summer Institute Day 2: Do the Math

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<tr>
<td>8:00-9:00</td>
<td>Breakfast at Green Path Hotel, transport to IIHS</td>
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<tr>
<td>9:00-13:00</td>
<td>Social venture business model canvas, customer empathy, value proposition</td>
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<tr>
<td>13:00-13:30</td>
<td>Lunch at IIHS</td>
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<tr>
<td>13:30-18:00</td>
<td>Social impact, social value proposition, social enterprise landscape in India, theory of change</td>
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### Tuesday, June 3, 2014: Summer Institute Day 3: Tell me a story
- 8:00-9:00: Breakfast at Green Path Hotel, transport to IIHS
- 9:00-13:00: Elevator pitches
- 13:00-13:30: Lunch at IIHS
- 13:30-18:00: Effective presentations, Meet the Entrepreneur

### Wednesday, June 4, 2014: Summer Institute Day 4: Show me the money
- 8:00-9:00: Breakfast at Green Path Hotel, transport to IIHS
- 9:00-13:00: Basics of finance, costing, investments, and revenue models for social ventures
- 13:00-13:30: Lunch at IIHS
- 13:30-18:00: Venture finance, sources of funding, social enterprise facilitator panel and speed dating

### Thursday, June 5, 2014: Summer Institute Day 5: Make it legal
- 8:00-9:00: Breakfast at Green Path Hotel, transport to IIHS
- 9:00-13:00: Legal issues for social ventures, Meet the Entrepreneur
- 13:00-13:30: Lunch at IIHS
- 13:30-18:00: Social entrepreneur panel and speed dating

### Friday, June 6, 2014: Summer Institute Day 6: Make it a habit
- 8:00-9:00: Breakfast at Green Path Hotel, transport to IIHS
- 9:00-13:00: Design thinking exercise, working with government,
- 13:00-13:30: Lunch
- 13:30-18:00: Slicing the pie, Meet the Entrepreneur

### Saturday, June 7, 2014: Summer Institute Day 7: Final presentations
- 8:00-9:00: Breakfast at Green Path Hotel, transport to IIHS
- 9:00-13:00: Pitch work time, wrap up, make it a habit
- 13:00-14:00: Lunch
- 14:00-19:00: Final pitch session and refreshments
- 19:00: Group dinner

### Sunday, June 8, 2014: Free
- 8:00-9:00: Breakfast at Green Path Hotel
- 9:00-17:00: Free (Green Path hotel check out by noon)
- 17:00: Farewell Activity/dinner
- 22:00: Depart for Bangalore International airport for 1:45am flight

### Monday, June 9, 2014: Return to US
- Early morning departure (01.45) on Air France Airlines flight AF #191 for Paris; non-stop Airbus 332 service with meals served en route (check baggage through to the Twin Cities).  Upon arrival (08.35) at Paris Charles de Gaulle International Airport proceed to connecting Air France Airlines flight AF #694 departing (13.50) for the Twin Cities; non-stop Airbus 343 service with meals served en route.  Arrive (4:05 p.m.) Minneapolis-St. Paul International Airport, Terminal 1-Lindbergh, and clear customs (*must have airline passenger paper or electronic itinerary to enter the Bangalore airport*)

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**Guest entrepreneurs / facilitators participating in Summer Institute:**
- Sreekrishna S. – Sattrva
- Vishy Kuruganti – mGaadi
- Dr. Radhika Meenakshi – Wise Owl
- Ishita Anand – BitGiving
- Martin Kiilu – Ankur Capital
- Sngdha Rao – Aavishkar
- Naga Prakasam – Indian Angel Network
- Devi Murthy – Kamal Kisan
- Niranth Bymana – Cyclercity
- Madan Padaki – Head Held High
- Prashanth Venkataramana – ESSMART
- Siva Devireddy, Go Coop
- Pankaj Jain – Impact Law Ventures
- Sridhar Pabbisetty – Centre for Inclusive Governance
- Steele Lorenz – MyRain
## Recommended Readings

### May 21: Urban development, transportation

**Urban development**

**Transportation**
- Chaturvedi, Atul (7 May 2014). *How vested interests ensured an alternative toll-free road to B’lore airport hits a wall*, Bangalore Mirror.
- Kumar, Krisha (23 Feb 2012). *Only mass rapid transit solutions can provide India’s urban commuters with efficient mobility*, The Economic Times.

### May 22: Solid waste management


### May 23: Energy


### May 28: Livelihoods, human rights

- Scott, Lucy (12 June 2012). *Female empowerment and extreme poverty reduction*, UN University.

### May 29: Water

- Sengupta, Somini (28 Sep 2006). *Water crisis grows worse as India gets richer*, IHT.

### May 30: Health

- Upton, John (7 Apr 2014). *Where the poor get blamed for the plague*, Motherboard.
- Singh, Prakarsh (2 Sep 2013). *How can India tackle child malnutrition?* Live Mint.

### May 31: Rural development, agriculture


### June 1-7: Social Venture Design

- SustainAbility (20 Feb 2014). *20 Business Model Innovations for Sustainability*, Executive Summary.
- IDEO. *Human Centered Design Toolkit*.
Instructor Bios

Julian Marshall, PhD.
In 1998, Marshall quit his job as an environmental engineer, moved to Singapore to teach, then to northern India to volunteer in an ecological development NGO. His volunteer work in Ladakh, India, made him wonder what is “development” and how does it work, and what does it mean to help others effectively, especially as an outsider to a culture. Unsure of the answers, but figuring that others may have thought about those questions, while in India he applied to graduate school. A decade (and two degrees) later, he is no more sure of the answers, but the questions remain, and with them, his drive to return to India. His recent research in India includes air pollution studies in Delhi, Hyderabad, and Bangalore, and in a rural community in northern Karnataka. As co-director of the Acara Challenge (http://www.acara.umn.edu), Marshall works with students to help them start businesses and non-profits in India that address environmental and health issues. He has a BSE in Chemical Engineering from Princeton, and an MS and PhD in Energy Resources from UC Berkeley. Marshall is an associate professor of environmental engineering; his research focuses on air pollution and public health. He has lived and worked in Barcelona, India, Indonesia, Minneapolis, San Francisco, Singapore, and Vancouver. His favorite Indian breakfast is chow-chow bath.

Fred Rose
Fred is the co-founder/director of Acara, a program of the Institute on the Environment, at the University of Minnesota. Acara is a series of courses and incubation activities to turn the passion of students and mentors into viable social and environmental ventures in the US and abroad. Fred has over 30 years of technology and business development experience in corporate, NGO and academic settings. He was director of technology strategy for Honeywell India. He has helped found social ventures in the US, India and Mexico and has taught social entrepreneurship courses at universities in six countries. He was also the founder of the local non-profit High Tech Kids. Fred's current work involves helping others to design solutions to global environmental challenges.

Brian Bell
As Assistant Director of Acara at the Institute on the Environment, Brian supports venture start ups seeking to turn a profit while launching solutions to impact problems that matter in the US, India, and East Africa. Through Acara, he has worked with dozens of early stage businesses. Brian has recently supported development of the Rainmaker micro irrigation design and sales platform with MyRain in India, guided due diligence with IMNPACT Angels in Minnesota, and consulted on cleantech microfinance lending with Envest in Central America. Brian’s multidisciplinary background in engineering, design, development, and entrepreneurship is founded on diverse experiences on four continents. He has led the development of Engineers Without Borders at the University of Minnesota; managed EWB water and sanitation projects with Uganda Rural Fund in Uganda and with Sustainable Organic Integrated Livelihoods in Haiti; designed productive public spaces with communities in Kibera, Kenya through Kounkuey Design Initiative; explored subsidization, participation, and behavior change in water-sanitation programs in South Asia with UN-HABITAT Nepal and the Government of India; and worked in structural and water resources engineering consulting and research in the US. Brian has a bachelor's in civil-environmental engineering from the University of Minnesota and a master's in environmental sciences-sustainable development from Utrecht University in the Netherlands. An amateur photographer, culinary enthusiast, avid traveler and couch surfer, Brian loves trekking in mountain regions, climbing indoors and outdoors, and cycling year-round.
APPENDIX A: VENTURE MODEL REVIEW GUIDELINE

Short responses (max 100 characters per response)

- Venture name
- Pitch (one sentence summary)
- Primary location of operation
- Stage (level of development)
- Primary industry
- Date Founded
- Number of employees
- Venture website
- Previous capital invested

Long responses (max 500 characters per response)

- Venture overview (one paragraph)?
- What is their competitive advantage?
- Who is their competition?
- How do they make money?
- What is their sales/marketing strategy?
- Who are their customers?
- What is their target market?
- What product or service do they provide?
- What customer problem are they solving?
- What social impact do they seek?
- Who is on the management team?
APPENDIX B: EXPERIENTIAL LEARNING REFLECTION

During the course we’ll reflect and analyze our readings and experiences using three questions: What? So What? Now What? Explanation follows.


—What happened?
—What did you observe?
—What issue is being addressed or population is being served?

So What? Analyze the experience.

—Did you learn a new skill or clarify an interest?
—Did you learn, hear, smell, or feel anything that surprised you?
—How is your experience different from what you expected?
—What impacts the way you view the situation/experience? (What lens are you viewing from?)
—What did you like/dislike about the experience?
—What did you learn about the people/community?
—What are some of the pressing needs/issues in the community?
—How does this project address those needs?

Now What? Consider the future impact of the experience on you and the community.

—What seem to be the root causes of the issue(s) addressed?
—What other work is currently happening to address the issue?
—What learning occurred for you in this experience?
—How can you apply this learning?
—What would you like to learn more about, related to this project or issue?
—What follow-up is needed to address any challenges or difficulties?
—What information can you share with your peers or the community?
—If you could do the project again, what would you do differently?

This content originates from the University of Minnesota Community Service-Learning Center. For more information see: http://www.servicelearning.umn.edu/info/reflection.html.
APPENDIX C: KEY CONTACT INFO

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APPENDIX D: KANNADA WORDS

Greetings
Welcome                     susvāgata
Hello                     namaste
Goodbye                     hogi barutheene
Thank you                dhanyavāda
Okay/Yes              howdhu
No                     illa
It's good            chennagidhe
Good morning  shubhodaya
Good evening  shubha sąyankāla

Basic phrases
What's your name?       ninna hesarēnu?
My name is ...    nanna hesaru ...
I'm fine            nānu cennāgiddēne
Just a little.        kēvala svalpa
I don't understand!   nanage artha āg'lilla

Relations
Brother        anna/tamma
Sister        akka/thangi
Father         appa
Mother         amma

Questions
How are you?    neevu hEgidheera?
How much?        eṣṭu
How old are you? Nimma vayasse?
Where is . . . ? . . . . elli?

Travel
Let's go     Balagade
Right        Balagade
Left         yedagade
Go straight   neravagi

Verbs
I want . . . . . . nanege beku
I have . . . . . . mae-re pas hai

Menu
Food                Oota
Water              Neeru
Bottled water    Bisleri neeru
Tea                cahā /chai
Lentils            masūra
Rice                akki

Egg                motțe
Indian flatbread  roti, naan, chapatti
Red Meat (goat)   mutton, mānsa
Chicken            kōlimari
Vegetables        tharakaari
Potato             aalu gadde
Cauliflower       hoo kosu
Spinach            pālaka
Carrot             karrattu
Cucumber           southe kaayi
Garbanzo bean     kadale kalu

Numbers
One                  ondu
Two                  eradu
Three               mooru
Four                naalakku
Five                aidhu
Six                aaru
Seven               elu
Eight               entu
Nine                ombatthu
Ten                hatthu
Twenty           ippatthu
Twenty-five    ippattaidu
Thirty         moovatthu
Forty          nalavatthu
Fifty           aivatthu
Sixty           aravatthu
Seventy      eppatthu
Eighty       embatthu
Ninety       tombatthu
One-hundred  nūru
One-hundred fifty nūru aivattu
Two-hundred   innūru
Two-hundred fifty innūru aivattu
One-thousand  saavira
Two-thousand     eradu sāvira
Three-thousand   mūru sāvira

More basic Kannada words and phrases:
http://www.kannadabaruthe.com/
http://mylanguages.org/kannada_verbs.php