

Response to Engineering Entrepreneurship Curriculum Development Grant RFP**Title: Incorporating Entrepreneurial Lessons from the Kentlands Development Case into CE51200 - The Comprehensive Urban Planning Process****PI Information:**

Name: Joe Sinfield

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School: Civil Engineering

College: Engineering

Campus address: CIVL G231

Phone number: 765-496-2742

Co-PI Information:

Name: Jon Fricker

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School: Civil Engineering

College: Engineering

Campus address: CIVL 4150

Phone number: 765-494-2205

Project description:

This project would involve a collaborative effort between the PI's and a graduate student to incorporate an entrepreneurially-oriented case study focused on the Kentlands Real Estate Development into CE51200 - The Comprehensive Urban Planning Process, an introductory course in Urban Planning taught by Prof. Fricker to both graduate and undergraduate students in the School of Civil Engineering. The foundational elements of the Kentlands Case Study were created under a prior Engineer of 2020 Seed Grant (Sinfield-Adams-Yadav, 2008: The Engineer as an Entrepreneur: Using Case-Driven, Problem-Based Learning to Develop Adaptive Expertise).

Learning objectives

The Kentlands case study was specifically designed to help engineering students develop fundamental target attributes of the Engineer of 2020, including the following:

- Primary targets: Synthesizing engineering, business, and societal perspectives, open-ended design and problem solving skills, entrepreneurial and intrapreneurial qualities, and adaptive learning.
- Secondary targets: Leadership, teamwork, communication, decision-making, management of change, working effectively in a diverse team, and innovativeness

These attributes are viewed as direct complements to the core objectives of CE51200 which, in addition to enabling students to apply analytical techniques to support the planning process, also include significant emphasis on helping students understand and explain the forces that shape the urban form and affect the urban activity system.

Description of course material

The Kentlands Real Estate Development Case Study includes a complete multi-phase case description, supplementary data and maps, as well as a teaching guide that outlines lesson points and an array of possible student engagement activities when delivering the case in class.

The case chronicles the entrepreneurial endeavors of Joe Alfandre, a large scale home developer, who orchestrated the transformation of the last large undeveloped site in the Washington DC area into one of the most successful real estate projects in recent US history. Unlike any residential developer of his time, Alfandre breaks from the normal paradigms of housing design and residential development to create from scratch a community of properties that are able to command a premium even during a financial downturn in the housing market. While most developers optimized their investment by maximizing land utilization for home construction, the Kentlands development traded off the number of built units for amenities and the creation of a small town atmosphere bringing a new set of performance considerations to suburban planning.

The case is presented to a class in four stages: students are first given conventional data on the housing market in Washington D.C at the time of this development, as well as socio-economic demographics for the region and asked to define optimal ways to develop the Kentlands property. Their solutions are discussed and the students are subsequently challenged to evaluate why from functional, social and emotional perspectives consumers may want a home, recognizing that the full breadth of these factors are often not considered. In the third stage, Alfandre's approach is revealed, and in the fourth the class discusses the unique aspects of "community building" Alfandre leveraged to enhance demand and capture a financial premium for his properties.

The broader lesson from this case is that while economic optimization and functional performance are often critical inputs to decision making, social and emotional factors can be equally, if not more influential on the success of a solution.

The intent of the effort proposed herein is to seamlessly incorporate this case and its primary lessons into the content delivered in CE51200. As envisioned, this effort will involve the following:

- The case content itself will be enriched with technical details and engineering data that will bring particular relevance to the CE51200 student who is developing expertise in urban planning
- The case will be modularized and expanded to align with the overall lesson plan and timing of CE51200

- Materials will be prepared to facilitate instructor-student discussions that will help link the characteristics of entrepreneurial behavior displayed in the Kentlands case to general engineering problem solving skills

Prior experience in using the proposed material

Dr. Fricker has taught CE51200 annually since 1995 and Dr. Sinfield has piloted use of the base content for the Kentlands case in CE597: Entrepreneurship and Business Strategy in Engineering.

Thoughts on disseminating the proposed ideas

The refined case content and improved case delivery plan will be directly incorporated into CE51200 and will also be employed, in modified form, in CE597, collectively reaching roughly 60-70 students each year.

Work plan and timeline

Activity	Week							
	1	2	3	4	5	6	7	8
Map Kentlands case lessons to CE51200 lesson plan								
Identify enhanced case data requirements and incorporate								
Define case delivery plan and teaching guide requirements								
Prepare student-ready, modular case materials								

Description of specific deliverables to be presented at the E2020 workshop

An overview of the refined Kentlands case study and approaches taken to incorporate it into CE51200 will be presented as an analog for more general means to effectively draw out entrepreneurially focused lessons into an analytically based engineering course.

Attachments: Estimated budget and curriculum vitae of key personnel

Coeus Proposal Development - Budget Summary

Proposal Number: 00027408 **Budget Version : 1**
Proposal Title: Internal Proposal
Investigator Name: SINFIELD, JOSEPH V
Period : 1 01 Jun 2010 - 31 May 2011

	Personnel Category	Start Date	End Date	EB Rate	Vac Rate	Percentage Charged/Effort	Fringe Benefits	Salaries & Wages
Graduate Students								
TBA, Student (8241), 1	Personnel - Grad Staff (.50 FTE)	06/01/10	06/30/10	6.70%		100.0 / 100.0	\$123.95	\$1,850.00
TBA, Student (8241), 1	Personnel - Grad Staff (.50 FTE)	07/01/10	07/31/10	6.70%		100.0 / 100.0	\$123.95	\$1,850.00
Total Graduate Students							\$247.90	\$3,700.00
TOTAL SALARIES & WAGES								\$3,700.00
Fringe Benefits: Total Fringe Benefits and Vacation Accrual:								\$247.90
TOTAL SALARIES & WAGES & FRINGE BENEFITS								\$3,947.90
Total Direct Costs								\$3,947.90
F&A (Indirect) Costs								
ON-CAMPUS								\$0.00
Total F&A (Indirect) Costs								\$0.00
Total Cost to Sponsor								\$3,947.90
Total Underrecovery Amount								\$0.00
Total Cost Sharing Amount								\$0.00
TOTAL COST OF PROJECT								\$3,947.90

Coeus Proposal Development - Budget Summary

Proposal Number: 00027408 **Budget Version :** 1
Proposal Title: Internal Proposal
Investigator Name: SINFIELD, JOSEPH V
Period : 1 01 Jun 2010 - 31 May 2011

Calculation Methodology

The full F&A (Indirect) Cost Rate is applied to the total direct costs, less the following exclusions

Total exclusions from F&A base \$0.00

The Allocated Administrative Support and Allocated Lab Expense Rates are applied to the total direct costs, less the following exclusions.

Total exclusions from Allocated Expense base \$0.00

F&A (Indirect) Cost Rates and Base

Start Date	End Date	Campus	Rate	Rate Type	Base	Indirect Cost
01 Jun 2010	31 Jul 2010	On	0.00	TDC	\$3,947.90	\$0.00
					Total	<u>\$0.00</u>

Employee Benefit Rates and Base

Start Date	End Date	Campus	Rate	Base	Calculated Cost
Grad Staff (.50 FTE)					
01 Jun 2010	31 Jul 2010	On	6.70	\$3,700.00	\$247.90
				Total	<u>\$247.90</u>

JOSEPH V. SINFIELD

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A. Professional Preparation

Massachusetts Institute of Technology	Civil & Environmental Engineering,	Sc. D.	1997
Massachusetts Institute of Technology	Civil & Environmental Engineering,	M. Sc.	1994
Bucknell University	Civil Engineering, B. Sc. (Summa Cum Laude)		1992

B. Academic Appointments

- Purdue University (West Lafayette, IN) May 2004 -present
- Assistant Professor, School of Civil Engineering - conduct research and teach at both graduate and undergraduate levels in two focal areas: 1) experimental methods, instrumentation, and sensor design with an emphasis on applications of optical spectroscopy in geo-environmental engineering, and 2) innovation management and entrepreneurship and intrapreneurship in technology focused sectors

- Massachusetts Institute of Technology (Cambridge, MA) Oct 1997 – Oct 1998
- Post-Doctoral Associate - investigated flow of contaminants through porous media using NMR

C. Non-academic Appointments

- Innosight, LLC (Watertown, MA) – Consultant May 2004 – present
- McKinsey & Company (Chicago, IL/Boston, MA) – Management Consultant Dec 1998 – Jan 2004
- Germaine & Associates (Cambridge, MA) – Consulting Engineer Jan 1995 - Apr 1997
- Haley & Aldrich Company, Inc. (Cambridge, MA) – Geotechnical Engineer May 1994- Jan 1995

D. Current funding sources – National Science Foundation, Indiana Department of Transportation-Joint Transportation Research Program, National Oceanographic and Atmospheric Association-MIT SeaGrant

E. Selected Publications

(i) Books

- Anthony, S.D., Johnson, M.W., Sinfield, J.V., Altman, E.J., “The Innovator’s Guide to Growth – Putting Disruptive Innovation to Work”, Harvard Business Press, 2008

(ii) Patents

- “Time-resolved Raman Spectroscopy”, Sinfield, J.V. and Colic, O., Patent Cooperation Treaty Application US08/69978 - July 14, 2008
- United States Utility Patent Application Serial No. 12/668,844 – Jan. 12, 2010

(iii) Selected full articles in refereed publications

- Sinfield, J., Colic, O., Fagerman, D., Monwuba, C. **Appl. Spec.**, “A Low-cost Time-resolved Raman Spectroscopic Sensing System Enabling Fluorescence Suppression,” v 63, n2, 2010.
- Sinfield, J., Fagerman, D. and Colic, O. **Comput. Electron. Agr.**, “Evaluation of Sensing Technologies for On-the-Go Detection of Macro-Nutrients in Cultivated Soils,” v70, n1, 1-18, 2010.
- Anthony, S., Johnson, M., Sinfield, J., **Sloan Mgmt. Rev.**, “Institutionalizing Innovation,” v 49, n2, 45-50, 2008.
- Sinfield, J., Hemond, H., Germaine, J., Johnson, B., Bloch, B., **ASCE J. Environ. Eng.**, “Contaminant Detection, Identification, and Quantification Using a Microchip Laser Fluorescence Sensor,” v133, n3, 346-351, 2007.
- Dunston, P., Sinfield, J., Lee, T-Y, **ASCE J. Const. Eng. and Mgmt.**, “Technology Development Decision Economics for Real-time Rolling Resistance Monitoring of Haul Roads,” v133, n5, 393-402, 2007.
- Santagata, M., Sinfield, J., Germaine, J., **ASCE J Geotech. Geoenviron. Eng.**, “Laboratory Simulation of Field Sampling: Comparison to Ideal Sampling and Field Data,” v132, n3, 351-362, 2006.
- Culligan, P., Sinfield, J., Maas, W., Cory, D., **Water Resour. Res.**, “Use of NMR relaxation times to differentiate mobile and immobile pore fractions in wetland soil,” v37, n3, 837– 842, 2001.
- Einstein, H., Indermitte, C., Sinfield, J., Descoedres, F., Dudt, J.-P., **Transport Res. Rec.**, “Decision Aids for Tunneling,” n1656, 6-13, 1999.
- Sinfield, J., Germaine, J., Hemond, H., **ASCE J. Geotech. Geoenviron. Eng.**, “Effects of Soils on Laser Induced Fluorescence of BTX Contaminated Pore Waters,” v125, n12, 1072–1077, 1999.
- Sinfield, J. V., Einstein, H. H., **ASCE J. Const. Eng. and Mgmt.**, “Tunnel Construction Costs for Tube Transportation Systems,” v124, n1, 48-57, 1998.
- Bloch, J., Johnson, B., Newbury, N., Germaine, J., Hemond, H., Sinfield, J., **Appl. Spec.**, “Field Test of a Novel Microlaser-Based Probe for In-Situ Fluorescence Sensing of Soil Contaminants,” v 52, n10, 1299-1304, 1998.
- Sinfield, J., Einstein, H., **Tunn. Undergr. Sp. Tech.**, “Evaluation of Tunneling Technology Using the ‘Decision Aids for Tunneling’,” v11, n4, 491-504, 1996.

(vi) Publications in popular press – multiple contributions in **Marketing Management, Advertising Age, Forbes.com, Financial Executive, BusinessWeek On-line, Strategy & Innovation**

Curriculum Vitae

Jon Douglas Fricker

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Professor Fricker is a registered Professional Engineer whose primary interests and expertise include transportation planning and network analysis. He regularly teaches courses at Purdue in Transportation Engineering (CE361), Transportation Planning (CE566), The Comprehensive Urban Planning Process (CE512), and Public Mass Transportation (CE560).

Prof. Fricker has published more than forty refereed journal articles, most on transportation planning or related topics, since joining the Purdue faculty in 1980. His recent and current research projects for include impacts of bypasses on small communities, integrating land use and travel demand models, applying origin-destination studies at the district level, enhancing transportation planning coordination between agencies, quality of input data for travel demand models, transportation security, and the calibration of traffic assignment models.

Prof. Fricker's interest, expertise, and reputation as a transportation planner are reflected in the extent of his activity with technical committees in professional societies, often in positions of leadership. A partial list is presented below.

Educational Record:

School	Dates Attended	Degree and Date
MIT	1965-70	S.B.C.E., 1970
Carnegie-Mellon Univ.	1970-72	MSCE, 1972
Carnegie-Mellon Univ.	1977-79	Ph.D., 1980

Selected Professional and Scientific Society Activities:

- Institute of Transportation Engineers
 - Member, Executive Board, Transportation Planners Council, September 1986 to September 1988, September 1991 to December 1993, January 1998 to January 2000.
- American Society of Civil Engineers
 - Chairman, Transportation Planning Committee, Urban Transportation Division, October 1984 to April 1987
- Transportation Research Board
 - Member, Committee ADB50, Transportation Planning Applications, February 1998 to present. Conference Chair, 8th TRB Conference on Transportation Planning Applications, Baton Rouge LA, April 2003.

Selected Publications and Reports

- Fricker, Jon D.*, and Huel-sheng Tsay, "Urban Transportation Impacts of Tall Buildings", *Journal of Transportation Engineering*, American Society of Civil Engineers, Vol. 111, No. 4, July 1985, p. 395-409.
- Fricker, Jon D.*, and Huel-sheng Tsay, "Drive-Up Windows, Energy, and Air Quality", *Transportation Research Record 1092*, Transportation Research Board, National Research Council, p. 22-25, 1987.
- Hamerslag, Rudi and Jon D. Fricker, "Parking Restrictions in Employment Centers: Implications for Public Transport and Land Use", *Transportation Research Record*, No. 1499, Transportation Research Board, National Research Council, 1995.
- Bose, Amica and Jon D. Fricker, "Reverse-Engineered Land Use Patterns to Minimize Congestion", *Transportation Research Record No. 1831, January 2004, p. 141-149.*