



## Director's Note



Let me express my best wishes to you for wonderful holiday season! We

have had another great year at the Ernst & Young Center for Auditing Research and Advanced Technology (CARAT).

First, I would like to highlight the CARAT activities involving our visiting scholars. Dr. Ken Cogger, President and CEO, Peak Consulting, visited the Center in March and again in July. He is working with me to develop an on-line financial risk assessment model that integrates research he published while he was on the faculty in the KU School of Business. His research was part of the FRAANK (Financial Reporting and Auditing Agent with Net Knowledge) technology developed at the Center.

Professor Ted Mock, Distinguished Professor of Audit and Assurance at A. Gary Anderson Graduate School of Management, University of California, Riverside, formerly with the University of Southern California, visited the Center in May and worked on several

projects with me and Sunita Rao, a Ph.D. student in accounting. Professor Mock has been an Ernst & Young Distinguished Visiting Scholar to the Center since its inception in Fall 1995. He has visited the Center every year. He has contributed to our research mission through 15 published co-authored articles in high quality journals, such as *Journal of Management Information Systems*, *International Journal of Approximate Reasoning*, and 5 articles in progress and/or under review.

Dr. J.P.J. (Hans) Verkruijsse, Partner at Ernst & Young Accountants in the Netherlands, and Philip Elsas, Founder and Director of ComputationalAuditing.com, visited the Center for a week in early September. The main purpose of their visit was to discuss how one can improve the audit process by integrating the research done here at the Center on Dempster-Shafer theory of belief functions. Their visit adds a new dimension to the Center's activities. It shows the work being done at the Center has relevance to the practice.

The second area about which I want to brief you is the various research projects currently in progress at the Center. We

have developed a fraud risk assessment model, published in an academic journal, *International Journal of Approximate Reasoning*. Just recently we completed an empirical study validating the model with the help of our friends at one of the big four accounting firms.

The preliminary findings are very exciting. The auditor subjects assessed fraud risk more appropriately when they used our fraud risk assessment model compared to auditors who did not have access to the model and used just SAS 99 and PCAOB guidance.

Another article of practical significance, by Srivastava and Kogan, is "Assurance on XBRL Instance Document: A Conceptual Framework of Assertions." This article provides a set of assertions that would help auditors perform an audit of instance documents. Interested readers can obtain a copy of this article from :

<http://ssrn.com/abstract=1289467>.

Third, we continue to make progress on developing FRAANK and SEEK-INF technologies. While these technologies were developed to gather unique sets



of data for the faculty's research at the KU School of Business, they have become valuable tools for the industry. This is especially true with the SEC requirement that top 500 public companies file 10Ks and 10Qs using XBRL format starting next year. (XBRL stands for extensible business reporting language.) FRAANK is being programmed to take 10K and 10Q in text format and create XBRL tagged documents without much human intervention, using the current taxonomy published by the SEC. The *KU Oread Magazine* had an article on FRAANK. If you missed reading it, go to:  
<http://ssrn.com/abstract=1289467>.

Fourth, I would like to mention that, as in previous years, the Ernst & Young Center for Auditing Research and Advanced Technology has selected this year's Ernst & Young Student Fellows and E&Y Faculty Mentors. Please see the list below for details.

The E&Y Student Fellowship program provides financial support of \$3,000 to each student for two semesters. Each student fellow works for an AIS faculty member who serves as E&Y Faculty Mentor.

The E&Y CARAT has also awarded three E&Y Scholarships of \$1,000 each this year. The E&Y CARAT received a good number of outstanding applicants for the Fellowships. I wish I had a few more fellowships to offer.

The E&Y Doctoral Fellowship in the amount \$5,000 is not yet awarded. This will be decided later.

Last year's Ernst & Young Doctoral Student Fellow was awarded to Sunita Rao, a Ph.D. student in accounting. Sunita's research deals with issues related to corporate sustainability reporting and its assurance.

I would like to thank the Ernst & Young "family" for the generous support of E&Y CARAT, and for providing special contributions to the scholarship fund. Please note that the E&Y CARAT received \$5,000 of funding from the Accounting and Information Systems area during Summer 2008, and \$6,000 from the School of Business for the academic year 2008-2009 to support a research assistant. Thanks to Associate Dean Keith Chauvin and AIS Director Jim Heintz for their generosity.

Next, all these good things have happened because of the continued support from the Ernst & Young "Family". In particular, I would like to thank Ellen Glazerman, Paul Penler, Bruce Snyder, Bill Taylor, and Bill Titera for their encouragement and support. I will fail in my duty if I don't thank Deb Deering for her tremendous support during the year and especially for making sure that CARAT visitors are well taken care of. Finally, I would like to acknowledge the editorial help of Toni Dixon, Director of Communications at the School of Business, for her help in creating this newsletter.

- Raj Srivastava  
Ernst & Young Professor and  
Director, CARAT



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# E&Y CARAT News Briefs

## **Academic Year 2008-2009 Ernst & Young Scholars and Fellows**

### **Ernst & Young Scholars:**

- Whitney Beaver
- Mark Whittemore
- Ashley Clark

### **E&Y Student Fellows and their the E&Y Faculty Mentors:**

1. E&Y Student Fellow: Jennifer A. Haynes  
Email: jenben@ku.edu  
Faculty Mentor: Professor Allen Ford

Jennifer Haynes is working towards her Master of Accounting degree with a concentration in Tax. Professor Allen Ford will serve as her mentor. Jennifer will help Professor Ford in his research related to tax issues. In particular, she will gather and analyze tax related to his research.

2. E&Y Student Fellow: Rohit Venkatasubban  
Email: rohit.venkatasubban@gmail.com  
E&Y Faculty Mentor: Professor Susan Scholz

Rohit Venkatasubban is working towards his BS degree in Accounting. During his E&Y-Minneapolis leadership internship the last summer, Rohit became interested in the implications of the impending switch to International Financial Reporting Standards (IFRS). He would like to do an in-depth study of implementation issues across the financial accounting curriculum. Specifically, he would begin with the syllabi and texts for Acct 200, 320, 420 and 721 to identify topics addressed in our curriculum. He would meet with the instructors to understand the level of detail covered for each subject. Many of the differences between Generally Accepted Accounting Principles (GAAP) and IFRS are at a fairly deep level, so they wouldn't necessarily affect the curriculum. Based on this information, he would provide a document for each course which would note the specific lecture/assignment areas of each class that will be changing under IFRS. In addition to helping the accounting faculty with this project, Rohit would also develop it into his honors thesis, acknowledging the financial support of CARAT.

3. E&Y Student Fellow: Laura Rowland  
Email: lrowland@ku.edu  
E&Y Faculty Mentor: Professor Raj P. Srivastava

Laura Rowland is a graduate student in accounting. She will be working on a project dealing with XBRL



(Extensible Business Reporting Language) taxonomy. She will be matching the accounting terms with the XBRL Spec. 2.1 taxonomy to be used in building FRAANK's intelligence for tagging purposes.

4. E&Y Student Fellow: Aravind Kumar Ilangovan  
Email: arvindh\_kumar@yahoo.com  
E&Y Faculty Mentor: Professor Raj Srivastava

Aravind Kumar Ilangovan is a graduate student in Electrical Engineering and Computer Science (EECS) at KU. He will work on the research projects "FRAANK" and "SEEK-INF." These systems are being developed and improved at the KU School of Business as on-going projects for extracting information from SEC filings. "FRAANK" stands for Financial Reporting and Auditing Agent with Net Knowledge. This project involves programming in Perl and SQL database languages to access 10Ks and 10Qs (financial and non-financial information) through the Internet of publicly held companies from the SEC Database called "Edgar." Once the information is parsed and identified, FRAANK uses the XBRL 2.1 taxonomy to tag it. "SEEK-INF" stands for Search Engine for Extracting Knowledge from Industrial Filings. SEEK searches all the SEC filings for information based on the user-provided search string. This search is designed to be more specific, such as paragraphs, tables, footnotes, etc. The student writes codes in Perl to parse the information on SEC filings in order to collect desired financial and non-financial information.

5. E&Y Student Fellow: Zeeshan Ahmed  
Email: zahmed@eecs.ku.edu  
E&Y Faculty Mentor: Professor Raj Srivastava

Zeeshan Ahmed is a graduate student in Electrical Engineering and Computer Science (EECS) at KU. He will work on the research project "FRAANK" and pick up the knowledge base from Aravind Ilangovan, who will graduate in December 2008 and leave CARAT. Zeeshan will continue to improve the performance of FRAANK and its features. In particular, he will build an on-line financial risk assessment model using FRAANK.

## Research Activities and Related Publications and Presentations During 2008

### Articles Published

1. Mock, T., L. Sun, **R. P. Srivastava**, and M. Vasarhelyi. 2009. An Evidential Reasoning Approach to Sarbanes-Oxley Mandated Internal Control Risk Assessment under Dempster-Shafer Theory. *International Journal of Accounting Information Systems*, Volume 10, Number 2, June (forthcoming, **lead article**). This paper won the best paper award at the 5th International Conference on Enterprise Systems, Accounting and Logistics, July 7-8, 2008, Crete, Greece.



2. **Srivastava, R. P.**, L. Gao, and P. Gillett. 2009. Representation of Interrelationships among Binary Variables under Dempster-Shafer Theory of Belief Functions. *International Journal of Intelligent Systems* (forthcoming).
3. **Srivastava, R. P.** and K. Cogger. 2009. Beliefs on Individual Variables from a Single Source to Beliefs on the Joint Space under Dempster-Shafer Theory: An Algorithm. *Proceedings of ICART 2009 – First International Conference on Agents and Artificial Intelligence*, Edited by J. Filipe, A. Fred, and B. Sharp, INSTICC Press, Porto (Portugal), January 19-21, 2009. (refereed).
4. **R. P. Srivastava**, and Li, C. 2009. Systems Security Risk and Systems Reliability Formulas under Dempster-Shafer Theory of Belief Functions. *Journal Emerging Technologies in Accounting* (forthcoming).
5. **Srivastava, R. P.**, T. J. Mock, and J. Turner. 2009. Bayesian and Belief Functions Formulas for Auditor Independence Risk Assessment. *International Journal of Auditing* (forthcoming).
6. **Srivastava, R. P.**, T. J. Mock, and J. Turner. 2009. A Fraud Risk Formula for Financial Statement Audits under the Bayesian Framework. *ABACUS* (forthcoming).
7. **Srivastava, R. P.** and S. Jones. 2008. A Belief-Function Perspective to Credit Risk Assessments. In *Advances in the Modeling of Credit Risk and Corporate Bankruptcy*. Edited by S. Jones, Cambridge University Press, Cambridge, UK.
8. **Srivastava, R. P.**, and G. Shafer 2008. Belief-Function Formulas for Audit Risk. Reprinted in the book *The Classic Works on the Dempster-Shafer Theory of Belief Functions*, edited by A. P. Dempster, R. R. Yager, and L. Liu, published by Springer.
9. Mock, T., A. Wright, **R. P. Srivastava** and H. Lu. 2008. The Framing and Evaluation of Multiple Hypotheses. *Asia-Pacific Journal of Accounting and Economics*, Vol. 15, pp. 123–140.

### Articles under Review or in Progress

1. Desai, V., R. Roberts, and **R. P. Srivastava**. A Conceptual Model for External Auditor Evaluation of the Internal Audit Function Using Belief Functions. Revised and resubmitted to *Contemporary Accounting Research* (third revision).
2. Bovee, M., T. Roberts, and **R. P. Srivastava**. Attributes of Information Quality: A Theoretical Model and Empirical Validation. Submitted to *Journal of Management Information Systems* (revise and resubmit).



3. Mock, T. J., **R. P. Srivastava**, and J. Turner. Assessing Fraud Risk: A Comparison of Bayesian and Belief Function Models. Submitted to *Auditing: A Journal of Practice and Theory*.
4. **R. P. Srivastava** and A. Kogan. Assurance on XBRL Instance Document: A Conceptual Framework of Assertions. Submitted to *Journal of Emerging Technologies in Accounting*.
5. **Srivastava, R. P.**, T. Mock, and A. Wright. Causal Schemata and Multiple Hypotheses Evaluation: A General Framework. Revise and resubmit as a new submission to *Mathematical Journal of Psychology*.
6. Gao, L., and **R. P. Srivastava**. The Anatomy of Management Fraud Schemes: Analyses and Implications. Ready to be submitted to *Contemporary Accounting Research*.
7. Rao, S. and **R. P. Srivastava**. Evidential Reasoning under Dempster-Shafer Theory for Assurance Services in Sustainability Reporting. Ready to be submitted to *The Accounting Review*.
8. Gao, L., **R. P. Srivastava**, and T. Mock. An Evidential Reasoning Approach to Integrating Fraud Schemes into Fraud Risk Assessment. Ready to be submitted to *The Accounting Review*.
9. Turner, J., **R. P. Srivastava**, and T. Mock, "Audit Risk Formula with the Risk of Fraud."
10. Mock, T., **R. P. Srivastava**, and A. Wright, "Auditor's Computational Model of Multiple Hypotheses Evaluation During Analytical Procedures."
11. Bovee, M. and **R. P. Srivastava**. Characteristics of Useful Accounting Information: An Empirical Validation of the Proposed International Accounting Model.
12. Li, C. and **R. P. Srivastava**. Cost Benefit Analysis of Internal Control over Financial Reporting Consulting Services under Dempster-Shafer Theory of Belief Functions.

#### **Presentations at Conferences/Symposia:**

1. Bovee, M. and **R. P. Srivastava**. Characteristics of Useful Accounting Information: An Empirical Validation of the Proposed International Accounting Model. Presented at The 13th ICIQ (ICIQ-08, MIT IQ) Conference, November 14-16, 2008.
2. **Srivastava, R. P.** and A. Kogan. Assurance on XBRL Instance Document: A Conceptual Framework of Assertions. Presented at the Sixteenth World Continuous Auditing & Reporting Symposium, Rutgers University-Newark, November 7-8, 2008, and at The 8th Bryant University XBRL Conference, Washington D.C., October 13, 2008.



3. **Srivastava, R. P.** An Integrated Approach to Assurance on XBRL Instance Document: A Conceptual Framework. Presented at The 15th World Continuous Auditing and Reporting Symposium, held in Heraklion, Crete Island, Greece, on the 7th and 8th of July, 2008.
4. Mock, T., L. Sun, **R. P. Srivastava**, and M. Vasarhelyi. An Evidential Reasoning Approach to Sarbanes-Oxley Mandated Internal Control Risk Assessment. Presented at The 5th International Conference on Enterprise Systems, Accounting and Logistics, held in Heraklion, Crete Island, Greece, on the 7th and 8th of July, 2008.
5. Rao, S. and **R. P. Srivastava**. Evidential Reasoning for Sustainability Reporting Assurance Services. Presented at the 2008 American Accounting Association Annual Meeting, Anaheim, California, August 4-6, 2008.
6. Gao, L., **R. P. Srivastava** and T. Mock. An Evidential Reasoning Approach to Integrating Fraud Schemes into Fraud Risk Assessment. Presented at The Midyear Auditing Section Meeting, American Accounting Association, Austin, TX, January 17-18, 2008.

**Ernst & Young Center for Auditing Research and Advanced Technology (E&Y CARAT),**  
Accounting and Information Systems  
School of Business, The University of Kansas, Lawrence

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KU Memorial Union, **CENTENNIAL**, 1301 Jayhawk Blvd  
University of Kansas, Lawrence, KS 66045-7548

**Tentative Program**

Monday, May 5, 2008

- 8:00 - 8:25 *Refreshments (Coffee, Tea, Bagels, and Danish rolls)*
- 8:25 - 8:30 Welcome by Raj Srivastava, Director, E&Y CARAT
- 8:30 - 9:00 Ted Mock, University of Southern California, "Some experimental results concerning the assessment of beliefs and probabilities in auditing"
- 9:00 - 9:30 Sunita Rao, University of Kansas, "Corporate Sustainability Reporting"



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- 9:30 - 10:00 Danico Lee, KU-ITTC, "SEEK-INF (Search Engine for Extracting Knowledge Industrial Filings): An Intelligent Search Engine for Extracting Information from SE Filings."
- 10:00 - 10:20 *Coffee Break*
- 10:20 - 10:25 Bruce Snyder, Partner, Ernst & Young LLP, "Check Presentation"
- 10:25 - 10:30 Raquel Alexander, University of Kansas, "Brief Remarks on Projects in "Progress"
- 10:30 - 10:55 Aravind Ilangovan, Manasa Keshavachandra, and Ke Liu "New Features of FRAANK- Challenges and Opportunities"
- 10:55 - 11:20 Qian Wang, University of Kansas, "Compliance with Segment Disclosure and its Impact on Analyst Forecast"
- 11:20 - 11:45 Jerry Turner, University of Memphis, "Bayesian and Belief Functions Formulas for Auditor Independence Risk Assessment"
- 11:45 - 12:00 Paul Penler, Ernst & Young LLP, "Update on XBRL Activities"
- 12:00 - 1:30 ---- Lunch at Kansas Union (ENGLISH ROOM) ----  
Remarks by Jim Heintz, Director, Accounting and Information Systems
- 1:30 Meeting Adjourned (Business meeting is postponed to a future date in June)



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## Some Pictures

Crete Island, Raj Srivastava is presenting his paper at The 5th International Conference on Enterprise Systems, Accounting and Logistics, Crete, Greece, July 2008, while Mrs. Madhuri Srivastava is enjoying the scenery.



Taking a lunch break at Ted Mock's place, August 2008.



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Hans Verkruijsse, Raj Srivastava, and Philip Elsas enjoying ice cream treats at the Plaza in Kansas City after a long day in Lawrence.

Tammie Wahaus, Philip Elsas and Hans Verkruijsse discussing how to make the audit process more effective and efficient.





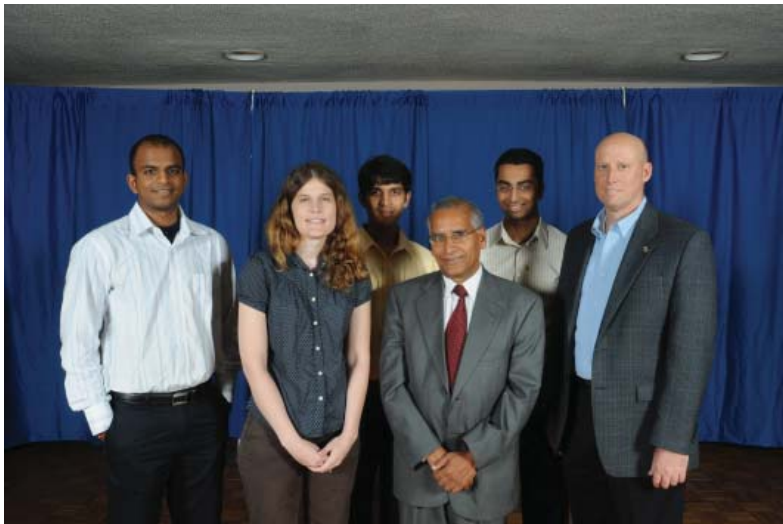
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Bill Titera, Philip Elsas, and Tammie Wahaus, engaged in a discussion on how to make the audit process more effective and efficient.



*Happy Holidays!*