LISA

Annual Report   2010-2011
November 11, 2011

LISA empowers
Virginia Tech researchers
to answer research questions,
win grants, publish papers,
complete dissertations,
and invent the future.

VirginiaTech
Invent the Future

LABORATORY FOR INTERDISCIPLINARY STATISTICAL

The 2010-2011 academic year was very successful for LISA, Virginia Tech's Laboratory for Interdisciplinary Statistical Analysis. LISA statistical collaborators helped more researchers around Virginia Tech than ever before, 1134 in total for the three main services of Collaboration Meetings, Walk-in Consulting, and educational Short Courses.

Highlights of 2010-2011:

- LISA hired a new Assistant Director, Dr. Chris Franck, who works closely with researchers at VBI and VTC.
- 2 LISA collaborators worked as on-the-ground statisticians on a successful interdisciplinary research project in Mozambique.
- LISA was featured in an invited session of the Joint Statistical Meetings, "Innovative strategies for incorporating consulting into graduate education."
- A new course, "Communication in Statistical Collaborations" was created to train students how to become effective interdisciplinary collaborators.
- 45 Video Coaching and Feedback Sessions were held to review video-recorded meetings to improve LISA faculty and students' statistical collaboration skills.
- 7 grants and 13 grant proposals involved LISA for statistical collaboration.

**Annual LISA Clients AYs 2005–11:
Collaboration, Walk–in, and Short Courses**
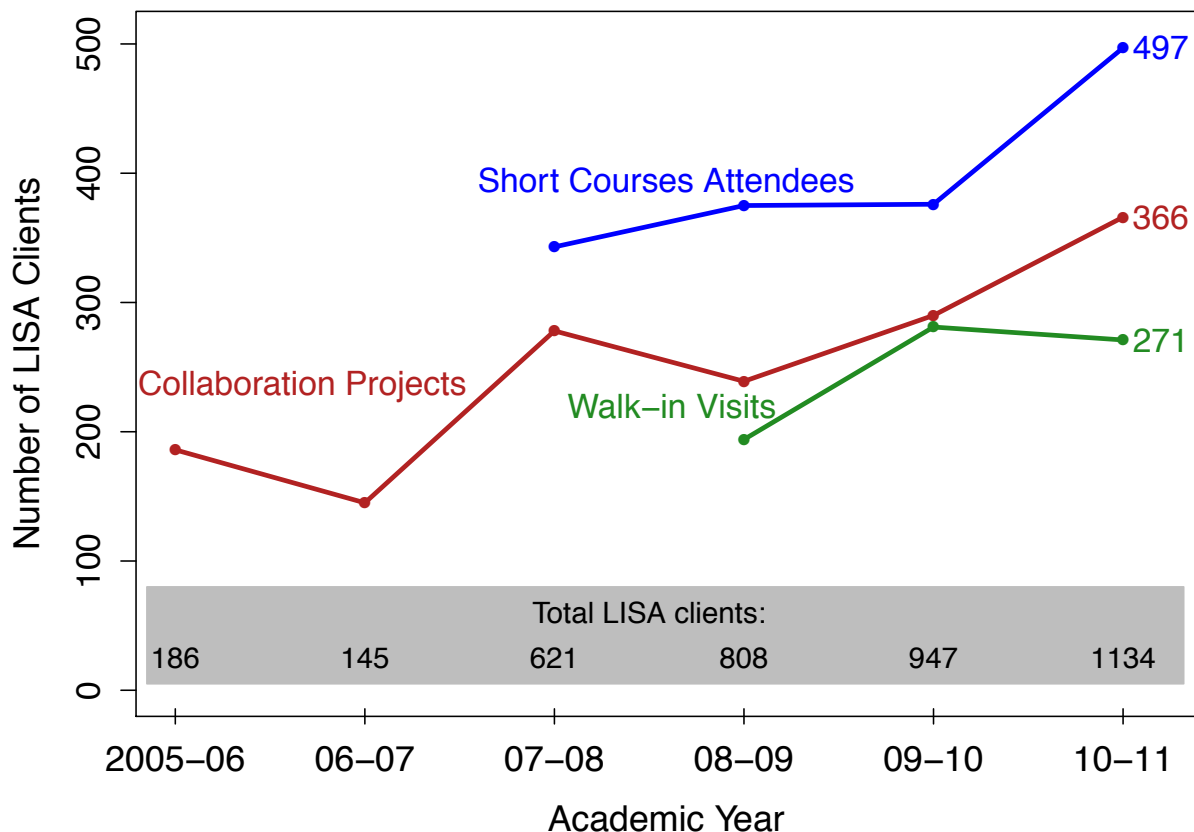
Dr. Eric Vance, Director

Dr. Chris Franck, Assistant Director

Lead Collaborators

Khaled Bedair	Dipayan Maiti	Sai Wang
Wandi Huang	Austin Rhodes	Pei Xiao
Nels Johnson	Dr. Anne Ryan	Chongrui Yu
Jennifer Kensler	Mark Seiss	

Associate Collaborators

Salman Cheema	Xinran Hu	Jinhui Sun
Tianlei Chen	Qing Li	Ram Thapa
Yajuan Chen	Hamdy Mahmoud	Alan Vaughn
Lulu Cheng	Devi Mishra	Matthew Williams
Mahafuzur Chy	Hayley Nelson	Liaosa Xu
Rebecca Dickinson	Yiming Peng	Yangyi Xu
Yuanyuan Duan	Rebecca Perez	Yincheng Ye
Zaili Fang	Dr. Keston Pierre	Huaiye Zhang
Katie Griffin	Liang Shan	Wanjin Zhang
Chao Han	Dr. Albert Shen	Yayan Zhang

Statistics Faculty Collaborators

Dr. Jeffrey Birch	Dr. Yili Hong	Dr. Scotland Leman
Dr. Feng Guo	Dr. Leanna House	Dr. JP Morgan
Dr. Ina Hoeschele	Dr. Dong-Yun Kim	Dr. Eric Smith
Dr. Golde Holtzman	Dr. Inyoung Kim	Dr. George Terrell

Fall 2010 Collaborators
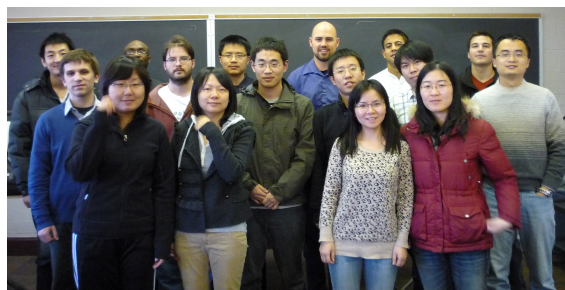
Spring 2011 Collaborators
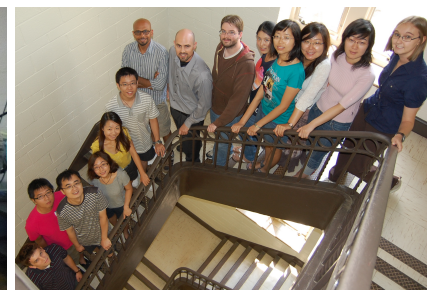
Summer 2011 Collaborators

Introduction and LISA Mission

LISA (Laboratory for Interdisciplinary Statistical Analysis) has been advancing research at Virginia Tech via expert statistical analysis since 1948. LISA's mission is to **train statistics students** to become interdisciplinary collaborators and to demonstrate the value of statistical thinking **through collaboration on research projects**. We provide statistical advice, analysis, and education to Virginia Tech researchers by offering individual collaboration meetings, walk-in consulting, educational short courses, and support for interdisciplinary research projects. LISA's statistical collaborators are trained to help researchers design experiments, analyze and plot data, run statistical software, interpret results, and communicate statistical concepts to non-statisticians.

The LISA collaborators are faculty and students in the Department of Statistics. LISA has a full- time director and assistant director who meet with faculty clients and oversee a team of graduate and undergraduate student collaborators. The Department has hired two new faculty members who assist with LISA activities. In addition, the entire statistics faculty may be available for collaboration on a case-by-case basis.

Statistical assistance is free for Virginia Tech faculty, staff, and students. LISA is funded jointly by the Office of the Vice President of Research, the College of Science, the Office of the Provost, the Graduate School, and six additional colleges (Agriculture and Life Sciences, Architecture and Urban Studies, Engineering, Liberal Arts and Human Sciences, Natural Resources and Environment, and the Pamplin College of Business. The Department of Statistics also provides funding for many of the LISA statistical collaborators and provides other support for LISA's activities. The Virginia Bioinformatics Institute (VBI) also provides funding for LISA.

Users of LISA engaging in sponsored research can benefit from in-depth help and are encouraged to include statistical consulting in grant proposals. This can take the form of a direct-cost line item, a full or partial graduate research assistantship, or partial funding of a faculty member's salary. LISA provides statistical consultation and collaboration on projects outside of Virginia Tech for a fee. Students in the Department of Statistics also provide pro-bono statistical consultation and collaboration for local community non-profits, schools, and governmental organizations through StatCom (Statistics in the Community).

This report summarizes LISA's main activities for the 2010-2011 academic year, highlights the innovations and progress achieved over the past year, and outlines several goals for the current year. In addition, this report presents the numbers of clients served and hours worked for the past six years to help place the past year's activities into context.

LISA is growing. From all over Virginia Tech, 1134 faculty, staff, and students met with LISA statistical collaborators for assistance in designing experiments and studies; collecting, cleaning, and analyzing data; interpreting results of statistical analyses; developing new theories from these results; writing grant proposals and scholarly papers; answering quick questions about statistics; and for learning new statistical methods.

During the 2010-2011 academic year, the 43 statistical collaborators of LISA met with researchers from 63 Virginia Tech departments for individual statistical collaboration meetings on 366 projects. During daily Walk-in Consulting hours, consultants met with 271 faculty, staff, and students representing 59 departments to answer quick statistical questions on projects requiring less than 30 minutes of assistance. Nineteen LISA Short Courses were offered to teach 497 graduate students and other university members (from 59 departments) how to apply statistics in their research. Overall, LISA provided at least 7344.5 hours of statistical assistance and education to members of the Virginia Tech community. Figure 2 shows a summary of the clients and hours for LISA's three main services. This year's 1134 clients were the most LISA has ever helped in a year.
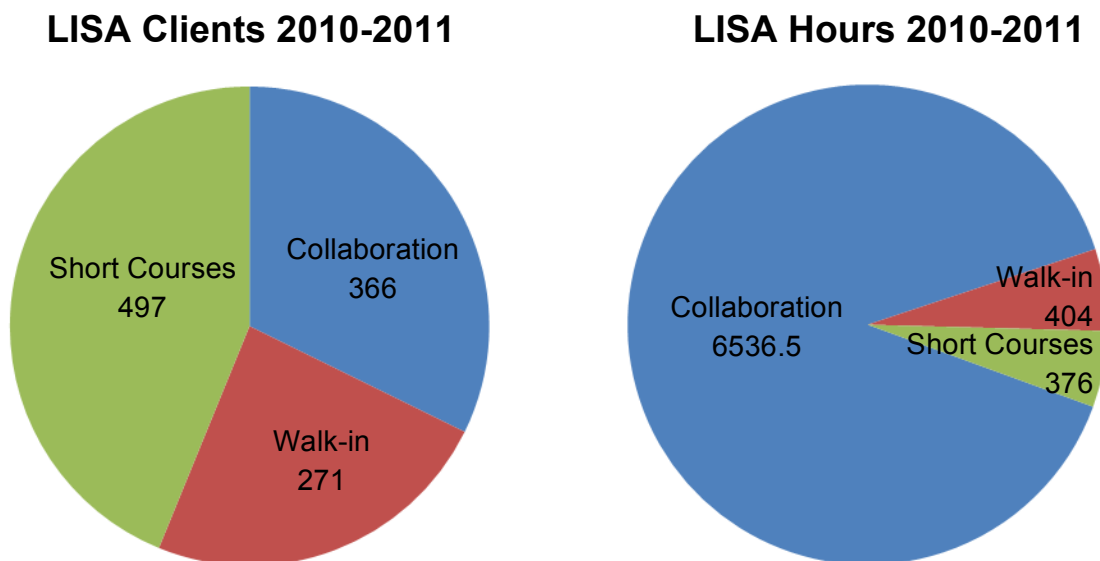

Figure 2: Number of clients and hours for LISA's three main services.

Activities and Innovations in 2010-2011

In last year's annual report we highlighted six goals we thought would advance us toward becoming the premier academic statistical consulting and collaboration center in the country. We are pleased to report that we have made excellent progress on each of them. Our progress is described briefly below and expanded upon in subsequent sections of this report.

1. *Increase collaborations with the Virginia Bioinformatics Institute (VBI), the Virginia Tech Carilion School of Medicine and Research Institute (VTC), and the Institute for Critical Technology and Applied Science (ICTAS).*

In August 2010, Dr. Chris Franck, who earned his Ph.D. in statistics from NC State University and his B.S. in statistics from Virginia Tech, assumed his position as the new LISA Assistant Director. Part of his funding comes from the Virginia Bioinformatics Institute (VBI). His primary focus is on collaborating with faculty researchers across Virginia Tech, including faculty at VBI and at the Virginia Tech Carilion Research Institute (VTCRI). During the 2010-2011 academic year, the Department of Statistics searched for and hired two new faculty members to extend LISA's mission of promoting and engaging in interdisciplinary collaboration. Dr. Jie Li, who earned her Ph.D. in statistics from the University of Iowa, was hired as a research assistant professor. Dr. Anne Ryan, who earned her Ph.D. in statistics from Virginia Tech, was hired as a visiting assistant professor.

2. *Use LISA to recruit to Virginia Tech statistics graduate students who are eager to apply their statistical knowledge to solve real-world problems and help researchers make discoveries in diverse fields.*

LISA expanded its website *www.lisa.stat.vt.edu* to include information for prospective students with the goal of encouraging more students to apply to the Department of Statistics and choose to enroll at Virginia Tech over our rival institutions. Despite the incoming graduate cohort of 2011-2012 being the largest class in the department's 63 year history, we feel that LISA's recruiting efforts can and should be improved.

3. *Create opportunities for LISA statistical collaborators to become involved "on the ground" in research projects around the world.*

In Summer 2011, LISA Director Dr. Eric Vance and LISA Lead Collaborator Mark Seiss traveled to Mozambique to be "on-the-ground" statisticians on a large, interdisciplinary research project. These experiences are highlighted in this report on .

4. *Present talks at national conferences so that LISA becomes recognized across the country as a model for academic statistical consulting and collaboration.*

Two posters about how LISA trains students to become interdisciplinary collaborators were presented at the Conference on Higher Education Pedagogy at Virginia Tech and at the U.S. Conference on the Teaching of Statistics in Durham, NC. An invited talk about the LISA model for statistical consulting and collaboration was presented at the largest statistics conference in the world, the Joint Statistical Meetings in Miami Beach, FL. A description of this session can be found on page 18.

5. *Improve the integration between LISA and the two graduate statistics courses "Introduction to Statistical Program Packages" and "Communication in Statistical Collaborations." The latter course is designed to teach second-semester statistics graduate students and undergraduate statistics majors what they need to know to be effective statistical collaborators that they don't learn in their other, more technically focused statistics courses.*

Dr. Chris Franck, the LISA Assistant Director, is in the process of revamping the graduate course, "Introduction to Statistical Program Packages" to make it more relevant for our students. In the past year, official approval was granted for the course, "Communication in Statistical Collaborations." Page 19 in this report has details about this new course.

6. *Use weekly meetings and video coaching and feedback sessions to improve LISA collaborators' overall statistical collaboration skills, including communication skills and technical statistical skills.*

The weekly LISA meetings are now more focused on discussing the statistical aspects of LISA collaboration meetings. Starting in August 2010, every LISA statistical collaborator who regularly meets with clients has a collaboration video recorded and reviewed in a small group setting every semester. Page 20 explains more about LISA's innovative use of video to improve our statistical collaboration skills.

One innovation over the past year not included in last year's goals was the creation of an award to recognize an outstanding LISA statistical collaborator based on nominations from clients. A full description of the award, winner, runner-up, and honorable mentions is on page 15.

"366 collaborations in 365 days"

As a *laboratory* for interdisciplinary statistical analysis, LISA focuses on creating new ideas by contributing statistical expertise to research projects in many disciplines. In fact, we had collaboration meetings with researchers in 63 departments at Virginia Tech. Collaboration meetings typically last for one hour, with multiple follow-up meetings as necessary. LISA statistical collaborators meet with researchers to discuss their research goals, the nature of the data collected or to be collected, how the data can be analyzed to answer the researcher's specific questions, what the statistical results mean in terms of the research goals, and how the researcher can explain the

A collaboration meeting between LISA Faculty Collaborator Dr. Anne Ryan and client Will Stanley from CNRE.

results to his or her intended audiences. After and between meetings, LISA collaborators typically analyze the clients' data or conduct background research to determine the most appropriate statistical analysis for the client.

LISA met with researchers during the fall 2010 semester on 141 projects for a total of 1930.5 hours. In spring 2011, LISA met with researchers on 142 projects for 2152 hours. In the summer semester LISA met with researchers on 83 projects for 2454 hours. Figure 3 below summarizes these numbers.

Collaboration	Fall 2010	Spring 2011	Summer 2011	Total
Clients	141	142	83	366
Hours	1930.5	2152	2454	6536.5

Figure 3: LISA Collaboration clients and hours by semester.

In total, LISA collaborated on 366 projects! Each of these collaborations is unique and has its own story; most are too long to tell in this report. A sample of feedback from collaboration clients can be found on page 14.

To offer services to Virginia Tech researchers who might not require the intense, personalized efforts of the collaboration meetings, **LISA provides walk-in consulting for answering quick questions** and giving statistical advice on smaller, simpler projects. Assistance is limited to less than 30 minutes when others are waiting.

LISA Walk-in Consultants were available from 1-3PM Monday through Friday in 401 Hutcheson Hall whenever classes were in session, for 144 hours total in the fall and spring semesters and 116 hours during the first and second summer sessions.

Wandi Huang assists Amar Mukhtar from the McNair's Scholars Program during LISA Walk-in Consulting.

LISA Walk-in Consultants met with 87 visitors during fall 2010, 108 during spring 2011, and 76 during the summer sessions. During the 2010-11 academic year, LISA walk-in consultants met with a total of 271 clients from 59 departments.

Walk-in	Fall 2010	Spring 2011	Summer 2011	Total
Clients	87	108	76	271
Hours	144	144	116	404

Figure 4: Walk-in visits by semester.

Short Courses

LISA teaches a series of evening short courses each semester to help graduate students apply statistics in their research. The focus of these two-hour courses is on **learning practical statistical techniques** for analyzing or collecting data. Taught by graduate students and faculty from LISA and the Department of Statistics, these short courses proved to be popular with 497 students, faculty, and staff from 59 departments around Virginia Tech. The tables in Figure 5 below describe the course titles, instructors, and attendance for the 19 short courses. Eight of these courses were taught twice due to limited classroom size, and two were taught as two-part courses. In 2010-2011, LISA taught a total of 27 short course sessions.

Nels Johnson chats with an attendee at his "Generalized Linear Models" course.

Fall 2010		
Date	Title	Attendance
October 12	"Design of Experiments," by Dr. Christopher Franck	49
October 19 & November 1	"Introduction to JMP," by Wandi Huang*	42
October 26	"T-Tests, ANOVA, and ANCOVA," by Jennifer Kensler	42
November 2	"Analyzing Non-Normal Data with Generalized Linear Models," by Sai Wang	32
November 8 & 9	"Introduction to SAS," by Mark Seiss*	39
November 15 & 16	"Using R for your Basic Statistical Needs," by Nels Johnson*	32
		236

Spring 2011		
Date	Title	Attendance
February 1	"Basic Principles of Experimental Design," by Dr. Chris Franck	31
February 7 & 8	"Using JMP for Statistical Analysis," by Wandi Huang**	28
February 15	"Regression," by Jennifer Kensler	12
February 21 & 22	"Introduction to SAS," by Mark Seiss**	24
February 28 & March 1	"Introduction to R," by Sai Wang*	19
March 14 & 15	"Bayesian Methods for Regression in R," by Nels Johnson*	21
		135

| Summer 2011		
Date	Title	Attendance
June 13	"What LISA Can Do for You and a Tutorial in T-Tests and ANOVA," by Dr. Anne Ryan	21
June 21 & 22	"Introduction to R," by Sai Wang*	35
June 28 & 29	"Linear Regression and Structural Equation Models (SEMs)," by Khaled Bedair*	28
July 11	"Mixed Models and Other Random Effects," by Dipayan Maiti	20
July 19 & 20	"Generalized Linear Models," by Nels Johnson*	22
		126

* Two sessions of these courses were held because of limited classroom size.

** These courses were taught as "Part 1" and "Part 2".

Figure 5: LISA Short Course titles, instructors, and attendance for 2010-2011.

Total Clients and Hours

The two figures below (Figures 6 and 7) show the **total number of LISA clients and hours** for our three main services of Collaboration, Walk-in Consulting, and Short Courses for the past six academic years. LISA was created in spring 2008 to succeed the Statistics Consulting Center, which was originally created in 1948. In summer 2008, LISA began offering short courses. In fall 2008, LISA began offering Walk-in Consulting.

Total LISA Clients:
Academic Years 2005–06 to 2010–11
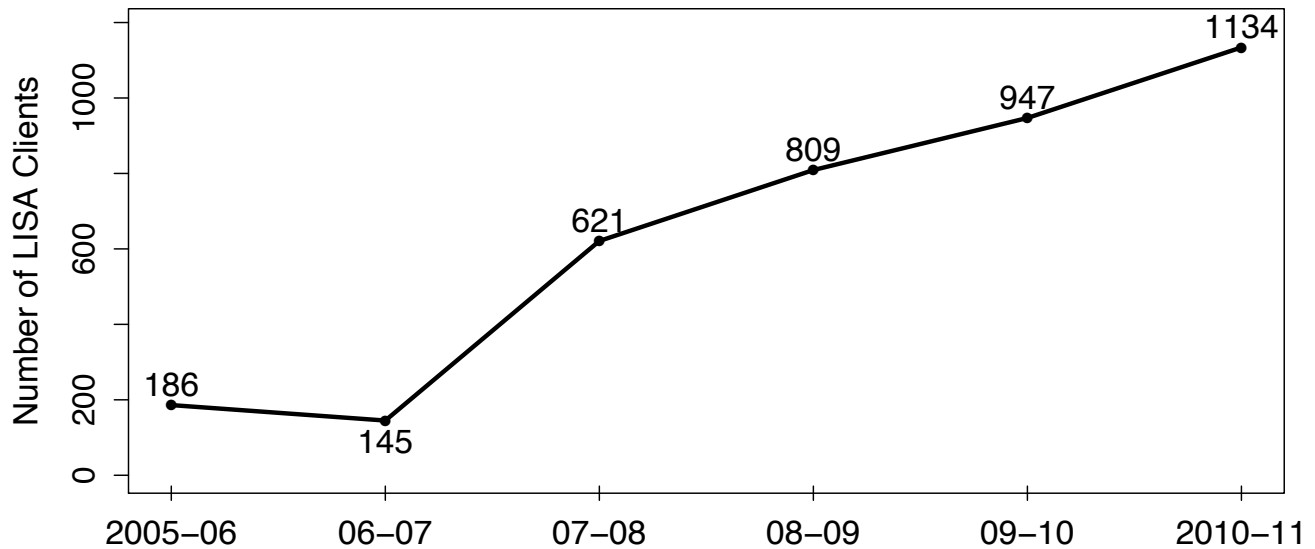
Total LISA Hours:
Academic Years 2005–06 to 2010–11
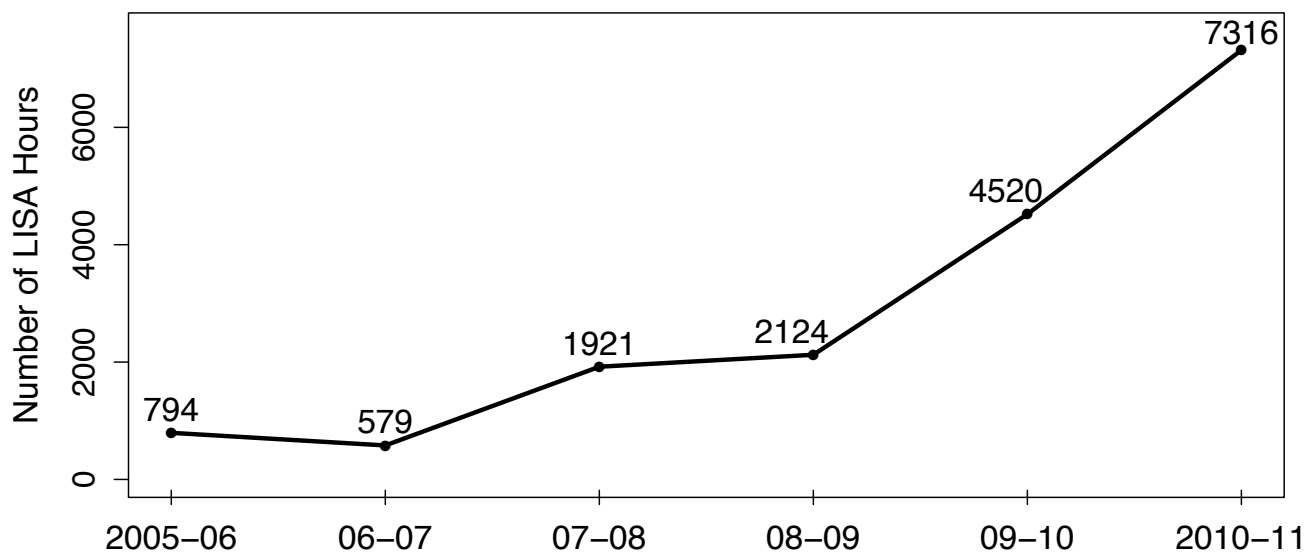
Figures 6 & 7: Total LISA clients for Collaboration, Walk-In Consulting, and Short Courses

At the conclusion of each academic term, clients who requested statistical collaboration meetings are asked to fill out a feedback survey evaluating their experience with LISA. Below are the summaries of two of the survey questions (Figure 8) and a selection of comments from clients in each of the eight colleges at Virginia Tech.

Q1: Was the service you received from LISA helpful?

Q2: Were you satisfied with your overall LISA experience?
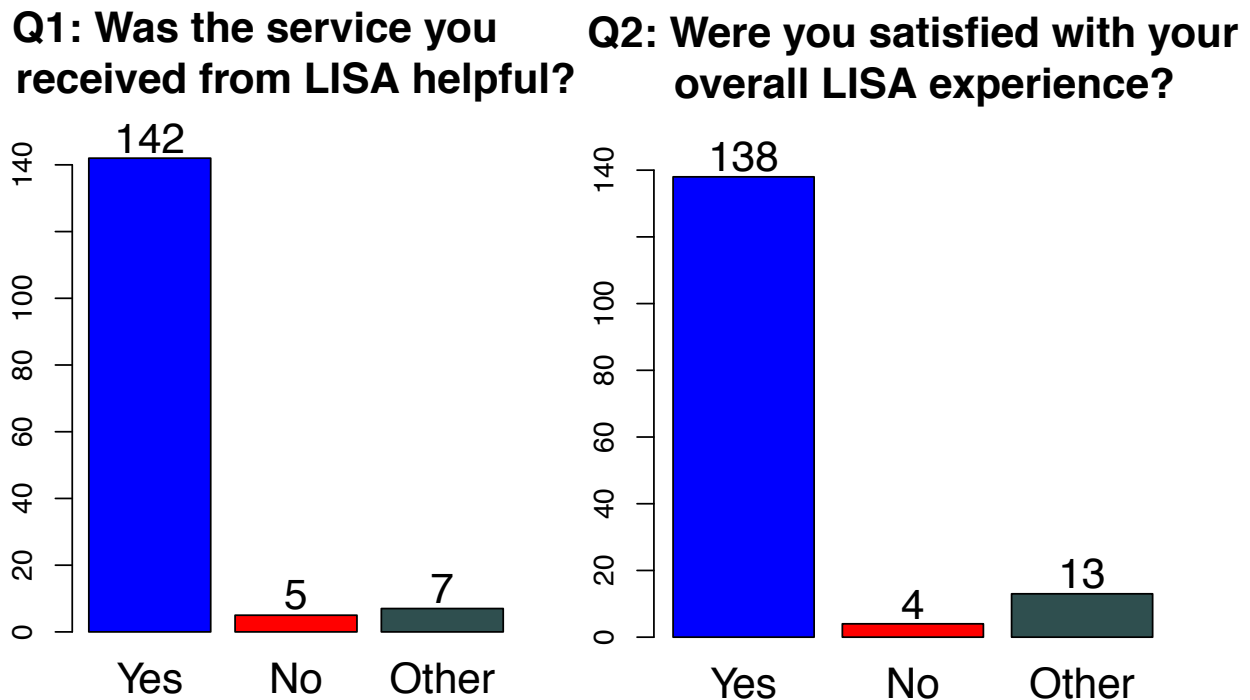
Figure 8: Summary of quantitative feedback on LISA collaboration meetings.

LISA also receives qualitative feedback on collaboration meetings. A selection of positive quotes from collaboration clients are presented in the next section. In several instances clients had an overall positive experience with LISA but made suggestions for improvement. One such suggestion was from a client who felt that her statistical collaborators did not have the expertise to answer her questions about a particular statistical method. LISA now takes into account the coursework completed by each statistical collaborator when assigning projects.

Selected Client Quotes

Tiffany Gross, CALS

Nels is very good at what he does. He worked with me to find a way to perform the appropriate tests with the statistical program I had available, as well as making sure I knew how to perform the tests on my own. Nels took an interest in the specifics of my project to be sure we were choosing the right kind of analysis. Nels is very patient and is great at explaining the reasons for using specific tests.

Ralph Hall, CAUS

[Mark's] commitment to ensuring that our surveyors [in Mozambique] collected high-quality data not only resulted in the best data set we have every created, but also helped the surveyors enhance their skills/capacity to collect information. The individual surveyor feedback sessions Mark held throughout the fieldwork helped promote VT's mission of international engagement by creating a team of surveyors in Mozambique who now have a real appreciation of the importance of collecting good quality information.

Roofia Galeshi, CLAHS

I would like to let you know that it has been a pleasure to work with Mark Seiss. Mark has been extremely helpful and knowledgeable on statistical software. His knowledge of SAS is commendable. Mark has helped me learn SAS and assisted me in writing an important section of my codes in SAS. He had helped me accomplish a great deal in a short period of time. After meeting him a few times I was able to write my codes. He was always available to answer my questions even during the breaks. He is very professional and takes his work seriously. He has been a great asset to me and it has been a pleasure to work with him. I would like to express my respect and appreciation for this bright young man.

Amy Snyder, CNRE

Nels made sure he understood all of my goals and experiments before we proceeded further. Communication is a huge strength and also his ability to remember my experiments from meeting to meeting. He also saw me last minute to answer additional questions.

Olga Bruyaka, Pamplin

I'm thankful that my request was satisfied so quickly.

Kristen Talcott, COE

Mark answered all the questions I had and did so in a way I could understand. He was good at answering general questions about statistics as well as specifics on how to run the analyses in JMP.

Kelsey Soppet, COS

Pei was very strong in her knowledge of the subject matter and her ability to explain it to me. She was helpful and kind. Yiming was helpful, although very quiet. I felt confident that this group will be of great aid to our research project, and they definitely got our feet on the ground.

Taranjit Kaur, CVM

Both were fantastic. They responded quickly and completely. I don't note any weaknesses. Zaili was great. Attentive, prompt and complete in his efforts.

2010 Outstanding LISA Collaborator of the Year Award

LISA is pleased to announce that the **2010 Collaborator of the Year is Nels Johnson**, a fifth year statistics PhD student from Alexandria, VA.

LISA provides Virginia Tech faculty, staff, and student researchers with quality statistical support for free. LISA's statistical collaborators are trained to help design experiments, analyze and plot data, run statistical software, interpret results, and communicate statistical concepts to non-statisticians.

Nels Johnson

At the end of a collaboration project, clients are asked to complete a feedback survey about the quality of service they received and if they were satisfied. This survey provides clients the opportunity to nominate a collaborator for the award as well as to provide feedback for the improvement of the collaboration service as a whole and for individual collaborators.

The Collaborator of the Year award was created in fall 2010 and 16 nominations for six individuals were received. Nominations were reviewed by the LISA Advisory Committee. The committee reviewed all client feedback for each nominee.

Nels Johnson joined the Department of Statistics in 2007 and has been working with LISA since 2008. He has worked on 125 projects with 85 clients. Clients frequently describe Nels as knowledgeable and conscientious. Perhaps most important to clients is that Nels takes a genuine interest in their research and is committed to helping them succeed. This commitment is demonstrated by the fact that Nels is working on co-authored publications with three LISA clients. Nels has also presented eight short courses for the LISA Short Course series and has hosted Walk-in Consulting for seven semesters.

"Echoing what multiple clients have told me, 'Nels is awesome!' He gives clients his full attention, thinks deeply about their problems, and explains the statistical solutions in ways the clients understand," said Eric Vance, LISA Director.

Nels also serves as the director of Virginia Tech's chapter of StatCom. StatCom (Statistics in the Community) provides pro bono statistical collaboration, consulting, and outreach for local non-profits, governmental organizations, and schools.

"Nels was very helpful and knowledgeable. He has consistently been one of the best consultants I've worked with at LISA. He has a strong interest in the types of biological questions I ask. It is obvious that he spends time thinking about my project between sessions and provided additional insight during later visits," said Erin Hewett, a graduate student in biological sciences.

The runner-up for the 2010 Collaborator of the Year award is Jennifer Kensler, a fifth year statistics PhD student from Fullerton, CA.

Jennifer started as a LISA associate collaborator in spring 2009 and became a lead collaborator in spring 2010. She has collaborated with 64 different clients on diverse research projects requiring expertise in many statistical methods.

Jennifer Kensler

"Jennifer was very helpful. She knew what statistical tests to suggest, knew how to perform them, and knew her way around JMP very well. I felt confident in the statistical test that Jennifer had suggested," said William Kuhn, a graduate student in entomology.

Jennifer has presented four LISA Short Courses and has hosted Walk-in Consulting for two semesters.

Eric Vance, LISA Director, commented, "Jennifer is an outstanding statistical collaborator! She goes the extra mile for her clients, coming up with solutions tailored to their needs."

Honorable mentions for the award include Zaili Fang, Rebecca Perez, Mark Seiss, and Matthew Williams. Below are a few quotes received from clients for each of these honorees.

Zaili was "very open to understanding the research and discussing the best ways to analyze the data and represent it," said Amro Ahmed, a graduate student from plant pathology, physiology, and weed science.

Rebecca was "courteous, listened well, and very responsive to my questions," said Yanping Wang, the Assistant Director of the Thomas E. Cook Counseling Center.

Mark was "very helpful and patient with me... His strengths are that he's a good communicator, is competent, and works well with people," said Olga Milenkaya, a graduate student from biological sciences.

"Matt Williams has been great. He has been able to bring stats down to a level that someone with a limited background in stats. He really understands and has been such an incredible help," said Brenna Traver, a graduate student in entomology.

LISA is dedicated to improving research by delivering high quality statistical support for interdisciplinary collaborations. One such interdisciplinary research project was to evaluate the impacts of the Millennium Challenge Corporation's (MCC) rural water project in Mozambique. The MCC is a U.S. government aid organization funding investments to aid economic development in northern Mozambique, including the drilling and installation of 600 hand pumps in rural villages that currently lack basic access to clean water. What are the health, economic, and quality of life impacts achieved when ones daily source of water improves from scooping water from a far away mud puddle to pumping it from a clean, nearby source?

Collecting water from a traditional well

In May 2011, LISA lead collaborator Mark Seiss and director Dr. Eric Vance traveled with the principal investigator on this project, Dr. Ralph Hall from the College of Architecture and Urban Studies, to Mozambique to collect baseline data from communities before water hand pumps were installed and to test whether statisticians in the field add any value to research projects. These two **"on-the-ground" statisticians** from LISA successfully contributed statistical expertise to improve all aspects

Measuring length to use as a proxy for health

of the baseline study, starting with the study design, through the data collection and data preparation phases, to the current stage of statistical analysis. LISA intends for this experience to serve as a **model for how having a data expert in the field to make statistical decisions can add tremendous value** to interdisciplinary research projects.

A new group of LISA statistical collaborators has begun preparations for a return to Mozambique in 2013 for the follow up study that will determine the impacts of the MCC rural water project.

Interviewing a woman during the pilot study

Training the enumerators on the PDA's used during the household interviews

"Innovative Strategies for Incorporating Consulting into Graduate Education" at JSM

On August 3, 2011, Dr. Eric Vance and Mark Seiss from LISA gave invited talks at the Joint Statistical Meetings in Miami Beach in the session, "Innovative Strategies for Incorporating Consulting into Graduate Education."

Dr. Vance's talk, "Training Statisticians to Become Interdisciplinary Collaborators," **explained how LISA trains graduate students to become effective, collaborative statisticians**. The typical student receives classroom training in the theory and methods of statistics and in communication in statistical collaborations. The next step is to work as an Associate Collaborator in LISA, contributing in meetings with clients and learning how to perform statistical analyses that will answer the client's research questions. Students in their third, fourth, or fifth year take on more

Mark Seiss, chair Steve Naber, Eric Vance, Xiao Chen, Doug Zahn, and Nagaraj Neerchal

of a leadership role in interactions with clients, with some students being promoted to the position of LISA Lead Collaborator. Ideally, the training culminates with a capstone international experience of a short-term exchange of statistical collaborators with a foreign university, a position helping to build statistics capacity in a developing country, or as an on-the-ground statistician for an international research project. A version of this talk can be found at www.lisa.stat.vt.edu/?q=about_us.

Mark Seiss' talk, "Tales from Mozambique as an 'On-the-ground' Statistician," explained his role in an interdisciplinary project studying the impact of drilling borewells and installing handpumps in rural villages in Mozambique that did not have access to clean water. During his 10 weeks in the field, Mark traveled with survey teams from village to village, downloaded over 1600 household interviews from the teams, analyzed the data in the field, gave feedback to the survey enumerators about errors they made or questioned them about unusual values, corrected the errors, and generated tables and graphs of the data every week to provide the funding agency in Washington, D.C. informative updates on the project.

The other speakers in the session organized by Christopher Holloman from Ohio State University were Xiao Chen from UCLA talking about their extensive and amazing website for statistical consulting www.ats.ucla.edu/stat and Nagaraj Neerchal from UMBC speaking about the entrepreneurial aspects of his statistical consulting center. Doug Zahn, professor emeritus from Florida State, was the session's discussant.

New Course: Communication in Statistical Collaborations

Approval from the College of Science was granted for a new, 3-credit course, "Communication in Statistical Collaborations." This course replaced the statistical consulting seminar, and is required for all undergraduate statistics majors and graduate students from the Department of Statistics.

Students observing a live collaboration meeting between Dr. Eric Vance and Laura Gambrel during a class session

Taught by Dr. Eric Vance, the director of LISA, the aim of the course is to **train statistics students to be effective interdisciplinary collaborators**. Students learn the communication skills needed to apply their knowledge of statistics to help researchers answer their research questions.

In this course, students learn and practice skills in:

1. Listening
2. Preparing for and managing an effective statistical collaboration meeting
3. Asking questions to understand clients' overall research goals
4. Giving effective feedback using behavioral language
5. Assimilating peer feedback and self-reflection in their work
6. Summarizing scholarly articles
7. Composing a professional business letter
8. Explaining statistical ideas and concepts to non-statisticians orally and in writing
9. Creating graphical summaries of data that tell the story of an experiment or study
10. Working on a team to use statistics to help a scientific collaborator answer his or her research questions.

The course culminates with the write-up and presentation of a final project applying statistics to answer a real scientific problem. Pairs of students collaborate with a non-statistician of their choosing on a research project they find interesting and present their results and experience to the class.

Students in the spring 2010 "Communication in Statistical Collaborations" class

Video Coaching and Feedback Sessions

LISA's main activity is interacting with clients during collaboration meetings to help them advance their research through the collection, modeling, analysis, and interpretation of data. In fall 2010, **LISA began collecting and analyzing data on itself to improve collaboration meetings** by video recording meetings, watching the videos, and then analyzing them in a small group setting of typically 5-7 participants, including 1 faculty member, 1 note taker, 1-2 "stars" of the video, and 1 or more additional students.

A screenshot from a video recorded collaboration meeting

Of the 39 LISA statistical collaborators who regularly met with clients in 2010-2011, all 39 had at least one collaboration meeting videoed and reviewed each semester they were active in LISA. Coaching and feedback in these review sessions focused on how to improve collaboration skills. Participants focused on three aspects of the meeting:

1. Interpersonal relationships between the client and collaborators
2. Intrapersonal attitudes and emotions
3. Technical aspects of the meeting, including whether the client understood the statistical advice.

After reviewing 46 collaboration meetings in 2010-2011, we were pleased to discover that these video coaching and feedback sessions **yield immediate benefits** for the participants, who learn what to stop doing (e.g., speaking before thinking, excess fidgeting, being disengaged) and what to start doing (e.g., ask the client what she wants from the meeting, paraphrase the overall research goals). Repeated video sessions offer opportunities for LISA statistical collaborators to practice new techniques and to verify if they actually work in practice to improve collaboration meetings.

	Fall 2010	Spring 2011	Summer 2011	Total
Videos Watched	20	14	12	46
Collaborators Reviewed	26	18	19	39*
Video Coaching and Feedback Sessions	19	13	13	45

* 39 unique LISA collaborators were reviewed in 2010-2011.

Photos of two LISA Video Coaching and Feedback Sessions:

(Left) Reviewing a video of Dipayan Maiti and Yincheng Ye

(Right) Reviewing a video of Nels Johnson and Liang Shan

LISA provides statistical support for sponsored projects and collaborates with researchers across disciplines on grant proposals. In 2010-11, LISA was funded on 7 grants. LISA collaborators were co-PIs or key personnel on 13 grant proposals.

7 Grants partially funding LISA:

(PI Warren Bickel, VT Carilion) 3/00-2/12
NIH/NIDA
"Improving Combined Buprenorphine Behavioral Treatment"
This grant provided funding for LISA statistical collaboration from Dr. Chris Franck.

(PI Warren Bickel, VT Carilion) 9/08-6/13
NIH/NIDA
"Executive Function Therapy for Stimulant Addiction"
This grant provided funding for LISA statistical collaboration from Dr. Chris Franck.

(PI Warren Bickel, VT Carilion) 7/10-3/15
NIH/NIDA
"Inter-Temporal Trade-offs in the Risky Decisions of Cocaine Addicts"
This grant provided funding for LISA statistical collaboration from Dr. Chris Franck.

(PI Mary Marchant, Department of Agricultural Economics) 9/10-9/11
USDA/NIFA
"Improvement and Marketing of the Food and Agricultural Education Information System (FAIES)"
This grant included funding for LISA statistical collaboration from Dr. Eric Vance, Dr. Albert Shen, and Katie Griffin.

(PI Ralph Hall, Department of Urban Affairs and Planning) 4/11-12/11
Millennium Challenge Corporation
"Impact Evaluation for the Millennium Challenge Corporation-Supported Rural Water Investment in Mozambique"
This grant included funding for LISA statistical collaboration from Dr. Eric Vance and Mark Seiss.

(PI Tom Campbell, ICTAS) 11/10-10/11
ADA Technologies
"A Carbon Nanotube Metrology System for Counterfeit Detection"
This grant provided funding for LISA for statistical collaboration from Dr. Anne Ryan, Dipayan Maiti, and Dr. Eric Vance

(PI Laurie Fox, Hampton Roads AREC) 2/11-6/11
"2011 Sustainable Landscape Survey"
This grant provided funding for LISA for statistical collaboration from Dr. Eric Vance

13 Proposals submitted:

(PI Jungmeen Kim, Department of Psychology)
NIH
"HIV/AIDS Risk-Avoidance Decision Making in Developing Adolescents"
This proposal included funding for LISA statistical collaboration from Dr. Chris Franck.

(PI Andrew McCoy, Department of Building Construction)
HUD (Housing and Urban Development)
"Impact of Market Behavior on the Adoption and Diffusion on Innovative Green Building Technologies in Residential Firms"
This proposal included funding for LISA statistical collaboration from Dr. Chris Franck.

(PI Skip Garner, VBI)
IMC, Inc.
"General Software Support"
This proposal included funding for LISA statistical collaboration from Dr. Chris Franck.

(PI Onwubiko Agozino, Department of Sociology)
(Co-PI **Eric Vance**, LISA)
NIH/NIAA
"Race, Ethnicity, Age and Gender Articulation in Existing Databases on Alcohol-Related Arrests"

(PI Kathleen Alexander, Department of Fisheries and Wildlife)
(Co-PI **Eric Vance**, LISA)
Morris Animal Foundation
"What is the epidemiology of *Mycobacterium mungi* - how can we control this emerging wildlife disease?".

(PI Ted Fuller, Department of Sociology)
(Co-PI **Eric Vance**, LISA)
NIH/NIA
"Declining Life Expectancy"

(PI Ralph Hall, Department of Urban Affairs and Planning)
(Co-PIs **Eric Vance**, LISA, Thomas Burbey, Darren Rosbach, and Peter Sforza)
NSF

"CNH: Evaluating the Vulnerability of Coastal Communities and Their Potable Groundwater Systems in Mozambique to Human and Natural Impacts"

(PI Mary Marchant, Department of Agricultural Economics)
(Co-PIs **Eric Vance**, LISA and Eric Smith, Department of Statistics)
USDA/NIFA
"Improvement and Marketing of the Food and Agricultural Education Information System (FAIES)"

(PI Wornie Reed, Department of Sociology)
National Cancer Institute
"Cultural Competency Training for Cancer Physicians"
This proposal was co-written by Dr. Eric Vance and included funding for LISA statistical collaboration.

(PI Wornie Reed, Department of Sociology)
American Cancer Society
"Development of Culturally Appropriate Cancer Prevention Video Messages"
This proposal was co-written by Dr. Eric Vance and included funding for LISA statistical collaboration.

(PI Christian Wernz, Department of Industrial Systems Engineering)
NIH
"Organizational Structures for Improved Elderly Care at Critical Access Hospitals"
This proposal was co-written by Dr. Eric Vance and included funding for LISA statistical collaboration.

(PI Onwubiko Agozino, Department of Sociology)
Spencer Foundation
"The Ethic of Hard Work and Achievement in Organizational Learning"
This proposal was co-written by Dr. Eric Vance and included funding for LISA statistical collaboration.

(PI Ralph Hall, Department of Urban Affairs and Planning)
Bill & Melinda Gates Grand Challenges Explorations Round 6
"Collecting Real-Time Health and Water Supply Data using SMS"
This proposal was co-written by Dr. Eric Vance and included funding for LISA statistical collaboration.

Publications and Selected Presentations

One of LISA's missions is to **contribute statistical thinking to interdisciplinary research projects**. The natural result of such projects is a co-authored publication. In 2010-11, LISA collaborators were coauthors on 5 publications:

5 co-authored publications:

Varghese R, **Williams M**, Gupta S, Priya S. (2011-07-01). Temperature-time transformation diagram for Pb(Zr,Ti)[O.sub.3] thin films. Journal of applied physics, 110(1), 014109.

Gupta PK, **Franck C**, Miller WJ, Gupta H, Forse RA. Development and validation of a bariatric surgery morbidity risk calculator using the prospective, multicenter NSQIP dataset. J Am Coll Surg. 2011 Mar;212(3):301-9. Epub 2011 Jan 17

Simin Hall, William McQuay, and **Eric Vance**, "Features of a Trust Model for a Complex System," *Proceedings of the ASME 2011 International Mechanical Engineering Congress & Exposition*, 2011.

E. K. Smith, L. M. Resler, **E. A. Vance**, L. W. Carstensen, K. N. Kolivras. 2011. "Blister Rust Incidence in Treeline Whitebark Pine, Glacier National Park, U.S.A: Environmental and Topographic Influences," *Arctic, Antarctic and Alpine Research,* 43 (1): 107-117

Ralph Hall, Emily Van Houweling, **Eric Vance**, Robert Hope, Jennifer Davis, "Assessing the Link between Productive use of Domestic Water, Poverty Reduction, and Sustainability: Senegal Country Report," *World Bank Water and Sanitation Program*, July 2011.

Franck CT, Osborne JA, Nielsen DM. An all configurations approach for detecting hidden-additivity in two-way unreplicated experiments. Submitted.

Zhou L, **Franck CT**, Yang K, Pilot G, Heath LS, Grene R. Mining for meaning: visualization approaches to deciphering arabidopsis stress responses in roots and shoots. Submitted.

Anderson DE, **Franck CT**, Madigan ML. The effects of age and gait spatio-temporal characteristics on required coefficient of friction during level walking. Submitted.

Brunson C, Fassino S, McInnes A, Narayan M, Richardson B, **Franck CT**, Ion P, Laubenbacher R. Evolutionary events in a mathematical sciences research collaboration network. Submitted.

Selected Presentations:

LISA collaborators are often invited to talk about statistics and/or LISA and to **present work stemming from statistical collaborations**. The following are a selection of presentations by LISA collaborators in 2010-11:

Posters:

Bickel WK, Jarmolowicz DP, Mueller ET, **Franck CT**, and Gatchalian KM. Neurobehavioral Screening of Recreational Drug Users: Implications for Employment

Lisa Hightower, Jolene Hamm, **Yu-Ming Shen**, Ashley Bell, Mary Marchant, Timothy Mack, Eric Smith, **Eric Vance**, "Studying Agriculture Internationally Tracking International Study Abroad Projects," 2011, Conference on Higher Education Pedagogy, Virginia Tech.

Eric Vance, "Educating Statisticians to Become Interdisciplinary Collaborators," 2011, Conference on Higher Education Pedagogy, Virginia Tech.

Eric A. Vance and **Nels G. Johnson**, "Educating Statisticians to Become Interdisciplinary Collaborators." 2011 United States Conference On Teaching Statistics.

Talks:

Franck CT, Osborne JO. "An All Configurations Approach to Testing for Latent Group-Based Interaction Effects in Two-Way Unreplicated Experiments." Contributed session at Joint Statistical Meetings 2011 Miami, FL.

Anne Ryan, "LISA and Statistical Thinking," a 45-minute guest lecture for the McNair Scholars Program at Virginia Tech presented on May 23, 2011.

Eric Vance, "Training Statisticians to Become Interdisciplinary Collaborators." Invited paper presented at the 2011 Joint Statistical Meetings in Miami Beach, FL.

Eric Vance, "Social Networks in African Elephants." Presented in February 2011 at the Department of Biological Sciences Seminar Series, Virginia Tech.

Eric Vance, "Social Networks in African Elephants." Presented in March 2011 at the CESCA Seminar Series, Virginia Tech.

Eric Vance, "Introduction to LISA," a 20-minute presentation at the Virginia Tech FDI New Faculty Orientation on August 17, 2010.

Statistics in the Community—StatCom for short—was first established by graduate students from the Department of Statistics at Purdue University in 2001 to **provide professional statistical consulting services to non-profit and governmental organizations in the community free of charge**. With the support of the American Statistical Association, StatCom now exists over an international network of colleges and universities, each with its own interpretation of how StatCom can serve their community.

The graduate students in the Department of Statistics at Virginia Tech began a StatCom program in 2008 and promptly joined the growing StatCom Network. The first director of VT StatCom was Matthew Williams. His tenure ended in May 2011 when he graduated with his PhD in statistics. The current director is statistics PhD student Nels Johnson, and the faculty advisor is Dr. Eric Vance, the director of LISA.

The following are some developments from this past year:

StatCom began its second year working with Dr. Carolyn Thomas from Ferrum College, the director of the Smith Mountain Lake Water Quality Monitoring Project and the Claytor Lake Water Quality Monitoring Project. StatCom member Kelly Geyer wrote a report concerning some regression analysis relating various measures of lake health to the distance from the dam at Smith Mountain Lake. StatCom member Elaine Nsoesie has been investigating methods for analyzing bacteria content in Smith Mountain Lake. Matt Williams provided some exploratory plots for spatial analysis of the data collected at Smith Mountain Lake.

2010-2011 was the first year working with Ann Angert, planning director of New River Community Action. StatCom was asked to help enter data for a census of the homeless in the New River Valley area of Virginia. StatCom member George Rooney has been working on the project, which is still in the organizing phase.

Students	# of Projects
Kelly Geyer* Nels Johnson	3
Elaine Nsoesie	# of Hours
George Rooney* Matthew Williams	90.75

*undergraduate student

Nels Johnson represented VT StatCom at the StatCom Network Business Meeting during the 2011 Joint Statistical Meetings in Miami, FL. VT StatCom plans to send members to the 2012 Joint Statistical Meetings to present some of their projects, as well as to the 8th International Purdue Symposium on Statistics to mark the 10th anniversary of StatCom's founding at Purdue.

For more information please visit: www.lisa.stat.vt.edu/?q=statcom.

LISA's primary goal is to be *the* premier academic statistical consulting and collaboration laboratory. To that end, LISA will continue efforts to provide high quality training for its students and faculty and high quality service, research, and education for clients. LISA will also seek to improve in these efforts. A selection of ideas and opportunities for improvement are listed below:

- Promote and emphasize interdisciplinary collaborations leading to student co-authorships and acknowledgments of LISA.
- Secure new and increased funding to bolster LISA's efforts to be the premier academic statistical consulting and collaboration laboratory.
- Increase the number of collaborations and connections with the Virginia Tech Carilion School of Medicine and Research Institute (VTC), the Institute for Critical Technology and Applied Science (ICTAS), and other departments within Virginia Tech.
- Improve the integration between LISA and the graduate statistics course, "Introduction to Statistical Program Packages," and between LISA Short Courses and the graduate service courses, "Statistics in Research, parts I and II."
- Improve the training of LISA statistical collaborators by regularly providing feedback on their performance.
- Encourage other universities to emulate LISA by writing papers and giving talks at national conferences about LISA.

In addition, LISA will work to expand opportunities for international capstone experiences for student statistical collaborators. LISA has three visions to expand upon its overseas contribution to the land grant mission of Virginia Tech through international research, educational exchange programs, and outreach.

- **VISION 1. ON-THE-GROUND STATISTICIANS:** LISA graduate students will work on large, global, interdisciplinary research projects as "on-the-ground" statisticians.
- **VISION 2. STATISTICAL EXCHANGES:** LISA students will learn to be internationally aware and culturally competent collaborative statisticians by participating in short-term (6-month) student exchanges within a network of statistical consulting and collaboration centers.
- **VISION 3. CAPACITY BUILDING:** Establish statistical consulting and collaboration centers at universities in countries lacking the infrastructure and statistical capacity to assist researchers with statistics.

Details about the visions and plans for the internationalization of LISA can be found on the LISA website: www.lisa.stat.vt.edu.

Contacts

Webpage: www.lisa.stat.vt.edu
Email: LISA@vt.edu

Tonya Pruitt, LISA Administrative Specialist
Department of Statistics
405A Hutcheson Hall
Virginia Tech
Blacksburg, VA 24061-0439
trpruitt@vt.edu
540-231-8354

Chris Franck, Assistant Director of LISA
Department of Statistics
213A Hutcheson Hall
Virginia Tech
Blacksburg, VA 24061-0439
chfranck@vt.edu
540-231-4375

Jie Li, LISA Faculty Collaborator
Department of Statistics
413-B Hutcheson Hall
Virginia Tech
Blacksburg, VA 24061-0439
jieli@vt.edu
540-231-8546

Anne Ryan, LISA Faculty Collaborator
Department of Statistics
416-C Hutcheson Hall
Virginia Tech
Blacksburg, VA 24061-0439
agryan@vt.edu

Eric Vance, Director of LISA
Department of Statistics
212 Hutcheson Hall
Virginia Tech
Blacksburg, VA 24061-0439
ervance@vt.edu
540-231-4597