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Nell Sedransk

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NISS: From Vision to National Institute

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ABSTRACT
The story of the National Institute of Statistical Sciences (NISS) is a story of heroes and obstacles, of wisdom and naiveté; but most of all it is a story of a vision for statistics as fundamental to the understanding of a complex world. This article discusses the formation of the institute and the recollections of many of the leaders who helped form this organization.

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Introduction

Science in the last quarter of the twentieth century saw dramatic changes as the hard sciences moved with increasing rapidity toward multi-disciplinary, integrated investigation of phenomena and the social and biological sciences entertained concepts that relied on massive, multivariate databases for their evaluation. By the mid-80s the consequent potential was emerging for a major shift and expansion in the roles for statistics in scientific research, in engineering, in industry, and in public policy. Within another 5 years, the clear definition of these challenges set an agenda and a vision for an institute that was realized in the National Institute of Statistical Sciences (NISS), which retains those concepts in its mission statement today, more than 25 years later. What sets NISS apart from other mathematics and science institutes in North America is that it was created *by and for* the profession of statistics, not as part of any other initiative or group of institutes.

The story of NISS is a story of heroes and obstacles, of wisdom and naiveté; but most of all it is a story of a vision for statistics as fundamental to the understanding of a complex world. The story begins with a collection of visionaries who saw multidisciplinary approaches to research and large multivariate databases as keys to advancing the frontiers of science and public policy. They also saw the need for an institute as the profession moved to meet the challenges of the "new science." The actual creation of the institute required another collection of statisticians equally dedicated to the interdisciplinary goals to face the pragmatic tasks of defining the institute structure, drawing up legal documents, and securing funding. Once the ribbon of the new institute was cut, its success depended on its leaders and advisors to translate the lofty goals into real projects, research results, and accomplishments of real people and an institute recognized with pride from the various sectors of the statistics profession.

The common link among the leaders at all stages has been their passion for statistics, their unequivocal belief that statistics is fundamental to interdisciplinary science, and their tenacity in bringing this vision to fruition. The story is told in their voices through their recollections, based on interviews assembled in honor of the 15th anniversary of the National Institute of Statistical Sciences, with a few other recollections included as NISS approaches its 25th anniversary.

Pre-NISS History

In the early 1980s, the increase in computational power was rapidly accelerating. Simultaneously research in the sciences was increasingly attempting to integrate multiple sciences into research projects. Distinctions among multidisciplinary, interdisciplinary, and cross-disciplinary science were seriously discussed. The Division of Mathematical Sciences in NSF had established two new mathematical science institutes[1] in 1982 to address contemporary agendas for mathematics. Statistics as a discipline and as a profession was engaged in the expansion of statistical computation and in examination of the potential roles of statistics in a multidisciplinary scientific world. This led to an NSF-supported committee of scientists and statisticians who developed a report on statistics[2] and cross-disciplinary science with a clear recommendation to establish an Institute of Statistical Sciences. A feasibility study followed.

CONTACT Nell Sedransk nsedransk@niss.org National Institute of Statistical Sciences (NISS), 19 T.W. Alexander Drive, PO Box 14006, Research Triangle Park, NC 27709-4006.

[1]MSRI—Mathematical Sciences Research Institute at University of California, Berkeley IMA—Institute for Mathematics and its Application at University of Minnesota

[2]"Cross-Disciplinary Research in the Statistical Sciences," IMS Panel on Cross-Disciplinary Research in the Statistical Sciences, *Statistical Science*, Volume 5, Number 1 (1990), 121–146.

Recollections: Ingram Olkin

In the 1980s a group of "activists" would get together at IMS and ASA meetings to discuss various needs for the profession; Jerry Sacks, Morrie DeGroot, and I were regulars along with others and there were some who would join on occasion. (It was also this group that managed, with IMS's backing, to get the journal Statistical Science *started.) One of the recurring themes in these discussions was cross-disciplinary research; and there were a lot of groups talking about it, the National Academies' Committees*[3] *(CATS and CNSTAT) and the professional societies. It all sort of culminated at the IMS meetings in Lake Tahoe in the summer of 1984; and this led naturally to a proposal to NSF (DMS) for a panel study on cross-disciplinary research. The proposal was prepared by Jerry Sacks and myself; IMS was the sponsoring agency; and the proposal was successful.*

The panel of statisticians from academia and from industry and scientists from various disciplines met at the old NSF Building on G Street downtown in Washington, with Jerry and myself as co-chairs. There were a lot of good ideas, and the discussions were good. In the end we came to closure but not to writing. Then someone came up with the brilliant suggestion to ask Connie Citro, from the National Academies, if she would serve as a consultant; and she was able to take the diverse topics and put them into a coherent whole.

I had mentioned the idea of an institute early on, but I had let it drop because there were mixed views by the Panel members about the wisdom of an institute. The final decision was to present a positive recommendation for the formation of an institute, but at the end of the report, so as not to diminish the key issue, namely, cross-disciplinary research. The report was published in September 1988.

The next step was a feasibility study (NSF-Division of Social and Behavioral Sciences had allocated $10,000); and the next question was who would chair such a committee. The Chair had to be someone who had a good reputation and would be respected by the community. Al Bowker was the founding Chair of Statistics at Stanford and later was Chancellor at CUNY and then at UC Berkeley; he was remarkable in being astute and succeeding in his goals, and he also was altruistic. He agreed to chair the feasibility study; and there was a meeting with what we hoped would be representatives from the different constituencies. The upshot of the meeting was a prospectus and a call for proposals, limiting the proposals to a geographic area within reach of Washington; and it was decided that the furthest west would be Chicago. The prospectus calling for proposals was more than just sent out; Al and I made contact with various university presidents about development of proposals. When Al and I flew down and told the Research Triangle of the proposal, we talked to people at NC State and Al gave a talk—it was really very funny. I vividly remember at the meetings with all the higher-ups to tell them about the proposal, Al started saying something about statistics, and he was interrupted by somebody who said, "You don't have to sell us; Gertrude Cox has sold us already."

On the committee that made the final choice were Al Bowker, Janet Norwood and myself, among others. We were offering nothing—except a great idea. But we really did have a great view of the possibilities and we had the two people who had a lot of credentials: Al had been Chancellor of two highly respected universities; Janet was Commissioner of the Bureau of Labor Statistics—so people believed us. That's why there were university presidents and provosts who said, "We're going to give space and academic position to an institute that is not going to give us any money." I think I knew for sure that the institute was going to exist when the proposals came in and I saw the North Carolina proposal with the faculty positions and money.

From my point of view the biggest accomplishment is that there is *an institute. I mean, when you go back and just think what is comparable to the formation of NISS in any other context—in every instance some kind of agency generated this or someone gave twenty million dollars or some such number. So if you ask me what's amazing: it is that we started with $10,000 dollars for people to have a meeting and that we were able to get five proposals—and not only five proposals, each one consisted of several universities. We got university presidents to buy into this idea and we actually ended up with an institute; and it* is *a center of statistics.*

From the beginning, the cross-disciplinary character for a proposed institute was clear in the minds of those involved in this endeavor. However, there were vocal statisticians who opposed the idea of an institute ("Why does statistics *need* an institute?"). Others more subtly opposed the idea of a cross-disciplinary focus and preferred the idea of a [NSF] mathematical statistics center. Still others wondered out loud at the feasibility study ("Why does that committee think it has the authority to do this?")

Recollections: Nancy Flournoy

The idea for a cross-disciplinary report came at the Lake Tahoe [IMS] meeting when Ingram was president of IMS. A lot has happened in the 30 years since then. Tahoe was my first IMS meeting; I had previously not thought of IMS in any real sense as separate from ASA and I had been to ASA meetings. At the Tahoe meeting in 1984 there were about 200 people and there were five women; I remember that one of those women was Judy Sunley, then Deputy Director for Math Sciences at NSF. So it was a very strange place to be from my point of view. I found it fascinating because it seemed to me that there were a lot of things going on beyond the presentations; there were little groups of men gathering here and there, talking and planning. As I recall the IMS world was still pretty much theorem-proof oriented; and the attitude toward applications was that applied statisticians were pretty much third- or fourth-class citizens. So I think the cross-disciplinary report, which was probably a sign of its time, had a huge effect on changing the discipline.

When the NSF panel decided to include a recommendation to form a national institute of statistics in the cross-disciplinary report, it gave no further immediate consideration to this recommendation. The focus in presenting the report was all on the other recommendations for stimulating cross-disciplinary research. I think the general feeling was uncertainty about what would happen to the idea of an institute after the report was submitted. However, Jerry and Ingram immediately took up the recommendation to form an institution once the report was filed.

The impetus to more funds was an independent request for funds from the Social Science division of NSF to study the feasibility of an institute of statistics with a very narrow scope. The first I heard about it was when Murray Aborn, the NSF program director who had received the funding request, told me he was prepared to award the money. I quickly arranged for Murray to meet with Jerry and Barbara Bailar (then ASA Executive Director) to discuss whether supporting such a narrowly focused institute would be good for the profession. We sold him instead on the benefits of having an institute focused broadly on cross-disciplinary research with statistics at the core and convinced him to redirect the funds he was prepared to allocate to ASA, so that ASA could sponsor the feasibility study.

I remember talking with Jerry about what kind of shape an institute should take and the idea was that it should represent the whole community. We talked about a virtual *institute, not too identified with a specific location, and about the idea of statistics in the center and all these other disciplines as spokes on the wheel. We spent a lot of time drawing pictures.*

When a group took the feasibility study to NSF, one suggestion from NSF was to give up the idea of an institute and instead to send them a proposal for a center in response to the call NSF had at that time. But there were things about the center concept that were completely contradictory *to the vision as we had developed it—we would have had to totally give up the prime character of the [cross-disciplinary] institute we were thinking of. There was a lot of concern that even if*

[3] CATS: Committee on Applied and Theoretical Statistics; CNSTAT: Committee on National Statistics

we got NSF support, the vision would be manipulated. There was a definite decision not to go for a center; so then the other decision was: If we weren't going to go for a center, how in the world were we going to create something and fund it?

What is really miraculous, I think, is the fact that as far as I can tell—even over 20 years—the core of the vision has not shifted. And through the implementation, through the early years, through everything up to the building of SAMSI[4]*, the vision of what statistics needed to grow into and how to get there, the only changes seem to have been mechanical, logistical changes.*

Getting Jerry to be Director was key there. Jerry, having been steeped in the vision as it developed, was in a position to carry it forward. I remember that the vision was not a popular notion in the 1980s; it was entertaining to talk about, but people were not putting their feet forward at all. The fact that this vision is intact today and that NISS is stronger than it has ever been is an incredible validation of that vision.

The formal path to an institute began with publication of the cross-disciplinary report in 1988 and its specific recommendation to establish an Institute of Statistical Sciences. The Institute of Mathematical Statistics (IMS) and the American Statistical Association (ASA) jointly took the lead as professional societies to initiate a Request for Proposals[5] with key features that would locate the Institute east of the Mississippi under the auspices of a consortium of universities. Its vision would be primarily interdisciplinary; and it would link together the various parts of the profession in academia, industry, and government from research through application to propel statistics into a leadership role in interdisciplinary science and public policy. Several potential candidate cities could be identified where co-located universities had serious strengths in statistics; which of these (or others) would be interested or able to form suitable consortia remained to be seen. Al Bowker and Ingram Olkin traveled to meet with university presidents, provosts, deans, and department chairs as consortia formed. Their presentation pointed out the important roles modern statistics was already playing in scientific research, agriculture, and industrial production; they pointed to the future potential for statistics in strong cross-disciplinary statistics research programs. They argued persuasively that the organizational structures of academic departments and industrial organizations just did not facilitate the needed level of cross-disciplinary research programs in statistical research and joint research between statistics and other fields. An Institute was proposed as a solution to this dilemma. In the end, four ambitious proposals were submitted.

The Carolina Story

Several serendipitous events took place in North Carolina in time for development of a proposal responding to the RFP for an Institute of Statistical Sciences. Dan Horvitz had just stepped down as Executive Vice President of the Research Triangle Institute (RTI) and was free to spend as much time as it took to prepare the proposal. Jim Martin, then Governor of North Carolina, had come to politics after an academic career as a research chemist. Sherwood Smith who was president of Carolina Power and Light was active on the Board of TUCASI and vigorous in support of growth for Research Triangle Park, and Triangle area cooperative research ventures. Phillip Griffiths as Provost at Duke University was committed to interuniversity cooperation and was at that time interested in starting a statistics effort. The three universities in partnership with North Carolina business leaders had incorporated a joint venture to establish a research park in the triangle of land with Raleigh, Durham, and Chapel Hill at the angles: Triangle Universities' Center for Advanced Studies, Incorporated (TUCASI). This corporation was to be administered through a Board of Trustees; research enterprises fell under the purview of the Research Triangle Foundation to be overseen by the provosts of the universities. Together the provosts asked TUCASI to allocate funds for support of the proposed institute, to assume a leadership role for the proposal consortium, and to provide land on its 120-acre campus in the Research Triangle Park for a building site for the new institute. In addition, financial support for the building was sought from the State of North Carolina. The heads of the statistics departments were successful in obtaining staffing support from their respective institutions, setting the stage for a fully responsive proposal that promised faculty positions, financial support, and land.

Extolling the virtues of statistics was not difficult in the Triangle, and an Institute was a natural addition to the Research Triangle Park with its highly developed industrial and governmental research facilities. A modicum of financial support ($12,000) was provided by the four statistics departments for proposal development. Five critical elements were provided in the proposal:

1. A grant from RTI of $250,000 per year for the first six academic years (1991–1997)
2. A 99-year lease of 10 acres of land on the TUCASI campus for $1 per year
3. An anticipated appropriation of $2.5 million from the State of North Carolina to cover half the cost of a 33,000 square foot building as requested by Governor James Martin
4. University positions at the Triangle universities: two tenured statistics faculty positions at any two of NC State, UNC and Duke, three full-time statistics faculty to serve as NISS Fellows at no cost during the first 5 years and three graduate students to serve as research assistants at no cost during the first 5 years
5. Initial space of up to 1500 square feet at no cost for the first 2 years at RTI.

The proposal also offered full software support from SAS, and supportive letters from both public and private organizations and leaders of Research Triangle Park.

At the visit to consider the North Carolina application, the ASA-IMS Site Selection Team raised the question of long-term financial stability. However, the promise of support from the state of North Carolina plus the business model created by John Geweke was persuasive.

Planning an institute was already a challenge; designing it for profession-wide ownership was an even more difficult task. The local government-industry-academia alliance responded directly to the vision for the Institute and required extensive

[4] Statistical and Applied Mathematical Sciences Institute, a Division of Mathematical Sciences, NSF-supported institute started in 2002 and located at NISS in partnership with Duke University, North Carolina State University, and University of North Carolina, Chapel Hill

[5] RFP for a National Institute of Statistical Sciences: issued December 1989; responses due March 1990

local commitment and local investment of time and money. The national base needed to be part of the structure of the organization, and needed to reach the profession from its theoretically inclined researchers to the statisticians immersed in applications. Dan Horvitz constructed an even balance of representatives from the Triangle consortium[6] and from the Statistical Sciences community[7] to guide the institute, to pass Bylaws required for incorporation as a not-for-profit organization, and to select the Board of Trustees.

Recollections: Dan Horvitz

A call from Ingram was the first contact that I had, so my role from the beginning was to try to bring together from the Triangle area those individuals who might be interested in an institute along the lines of the proposal. I was free to do this because I had stepped down at the end of 1989 as the OSC Executive Vice President at RTI; I still had my office and nobody asked me what I was doing. So I could devote a lot of time to working to bring this proposal to success, which was very nice because it needed somebody to do that almost full-time, in my opinion.

Of course, the founding of statistics in the Triangle goes back to 1941 when Gertrude Cox came to found first the Department, then of Experimental Statistics, at [North Carolina] State. She hired Harold Hotelling, and he started the Department of Mathematical Statistics at Chapel Hill in '42. Then in '46 Bernie Greenberg, who had finished his degree at North Carolina State, started Biostatistics in the School of Public Health at Chapel Hill; and then Cox created an umbrella called North Carolina Institute of Statistics. Duke came much later when Phil Griffiths brought together the department heads from those three departments to say that he was thinking about starting a statistics effort at Duke and he recognized that there were already three PhD granting statistics departments within 25 miles of each other—so what did we think about that? So there was a long history of significant and productive partnerships across the Triangle both inside and outside of statistics that predated NISS. One of the main things was TUCASI- a joint effort to bring research and development partnerships from industry and from federal agencies to the Triangle.

On the day that Al Bowker and Ingram Olkin had scheduled their initial visit to North Carolina, the TUCASI Board was already scheduled to meet. Dan Solomon arranged with Jim Roberson, President of the Research Triangle Foundation and with Sherwood Smith who was to chair the meeting for Bowker and Olkin to make this first presentation to the Board.

When we brought Al Bowker and Ingram Olkin to make the presentation to TUCASI, Sherwood Smith was one of the key people; he was the one who arranged the meeting with the governor. So we had a situation where we had an industrial leader very much interested in the growth of the area with respect to academic activities and research and science; and there was the governor who also understood. Phil Griffith as Provost at Duke was very much supportive because it turns out that the decisions by the university to support or request money from TUCASI to support the endeavor was in the hands of the provosts. This project would not have gone ahead if the provosts would not have agreed to support us financially at the levels we needed. I don't think I had more than two or three meetings with Phil Griffith, but I gathered that he was the one among the three provosts who was most interested and whose influence led to the decision by the universities to put up the considerable financial support that appeared in our proposal. Essentially the universities guaranteed two tenured faculty positions plus three statistics faculty to serve as Fellows at no cost to NISS for five years, plus one graduate student from each university as well for five years. I don't mean to minimize the roles of the Department heads, because they were the major group of people that pushed the proposal through—but we needed University leadership to get the universities into the act so that they could play that very significant role.

In developing the proposal, I made it the first order to try to respond closely to the cross-disciplinary vision put forward in the Cross-Disciplinary Report: *to bring statistical practice to bear on the most important problems of the day across the discipline. The structure of the proposal was an attempt to demonstrate why statisticians in the Triangle felt that we had the capability to deliver on that. The new institute had to be careful not to infringe, from the viewpoint of the general statistical research community, on their funding opportunities, particularly at NSF. But I was still under the impression that there was a very good chance that we could get core funding to support the basic infrastructure for a fairly long term, once the Institute was put in place; and we did go back with an unsuccessful proposal to NSF and we did also approach the Sloan Foundation.*

Once we put the proposal together, and the support was there from the universities, it attracted a lot of letters of support from the ASA and IMS, RTI, and so forth. Really the idea for the Institute proceeded successfully because of the four leaders of the Statistics Departments, Dan Solomon (NC State), Stamatis Cambanis and Barry Margolin (UNC), and John Geweke (Duke). John made a particularly important contribution that I would guess weighed heavily with the site selection team that ASA and IMS had put together. He built the model for the ultimate self-sufficiency of the organization, making the case to show how NISS could survive, flourish and be self-sufficient after the six years over which the original core operating funding provided by the Research Triangle Foundation was spread.

The hardest thing I had to do was to figure out how to draft by-laws that would show the split ownership. I thought it was important that we formally incorporate the organization in a way that shared the ownership between the Triangle enterprises and the international statistics community. I found that we were not entirely unique and that we could set up a group of people to represent the ten member organizations that were the actual owners. The representatives would be responsible for appointing trustees; if the situation ever arose where NISS would have to dissolve, whatever remained in the way of resources would revert to the members to decide their distribution. In any event, I had some advice from someone in the legal department at Duke; he did not think I needed all that representation—what turned out to be 10 members plus the ten ex-officio members who had each appointed a second member. I don't recall his exact reasons, but I do recall that I decided I was not going to agree with him. He still assisted with the arrangement that I had come up with, but he never complained about my decision, publicly. I thank him for that. At the initial meeting of the members on December 3, 1990, the leadership in straightening out two or three items in the by-laws came from the Chancellor at the University of North Carolina. Then the by-laws were approved and we proceeded with official incorporation as a not-for-profit organization in January 1991.

When was I fully convinced that the institute was a good thing and that it would survive? I spent time revisiting this question when I was Interim Director that first year and then rather frequently up until about '95. At that time I could see the indications; but I don't think I became fully convinced until the NSF did decide to include NISS in significant funding, both in terms of research grants and eventually SAMSI. That was the wall that NISS had to climb. I guess that I was supportive because all my life I was mostly an applied statistician and engaged in the statistical side of joint efforts with other disciplines. The statistics problems that we faced were mostly in how best to generate information in a particular problem. In the end it seems to me that for an institute concerned with cross-disciplinary research there have to be examples where statistics has made major contributions to research in specific areas; mainly you show and demonstrate the role of statistics through examples; the actual projects demonstrate very loudly—or as loudly as possible—the value of statistics.

First Steps

The founding ceremony was held on December 3, 1990 at Research Triangle Institute. Dignitaries representing each of

[6] President, Duke University; Chancellor, UNC-Chapel Hill; Chancellor, NC State; President, RTI; President, TUCASI

[7] President, ASA; President, IMS; President, ENAR/WNAR (alternate years); Chair, COPSS; Chair, AAAS-Section U

NISS's constituencies were present. Governor Jim Martin of North Carolina, who had followed through to get the state legislature to approve the capital appropriation for a NISS building was on the dais. Sherwood Smith was master of ceremonies. Richard Cyert, President of Carnegie Mellon University gave the keynote address outlining the vision for an interdisciplinary institute. Ingram Olkin spoke on the purpose and expectations to be realized by the new institute. Following a luncheon at the Governor's Inn, the NISS Members undertook the important business of approving the by-laws, required by North Carolina law for incorporation, which took place in January 1991. In the spring of 1991, the first business under Dan Horvitz as Interim Director was to initiate the search for the first NISS Director. The Local Organizing Committee, acting as Search Committee, considered applications and nominated Jerome Sacks of the University of Illinois, who accepted the post as of August 1, 1991.

Recollections: Jerry Sacks

The way I remember, it started during my year (1983–1984) at the NSF. I recall talking to Ingram about interdisciplinary-multidisciplinary science, a topic much discussed in the halls at the NSF. People were concerned that science was going in multiple directions with overlapping interests and little was known about how to bring something together. Matters came to a head at the IMS Tahoe meeting in the summer of 1984 where further conversations included David Moore, Ron Pyke, Bruce Trumbo, and Ed Wegman and led to a plan for a report about cross-disciplinary research in statistics with a thought that such a report could be used to generate extra funding for the field. Money for the study of this idea was obtained from the NSF and a panel was formed. At one meeting (in 1986 or 1987) Ingram proposed the idea of an Institute to implement the recommendations in the report. Enthusiasm of several on the panel was muted but not fatal to inclusion of the recommendation in the report.

I was not involved with the competition nor with the formation of the North Carolina consortium and its winning proposal but when I arrived as Director I came to understand how savvy Dan Horwitz and the others were.

One of the hardest things in setting up the institute and bringing it to life was getting the community—I mean the entire (or at least a substantial majority) statistical community—to believe in it. The idea of a consortium instead of a single university helped because no one university was going to get all the benefits. Getting the societies to be owners was a clever stroke because you could always say to skeptical colleagues "but you do *own the Institute."*

There were quite a few roles I thought NISS could play to serve the profession. But most important was to put together some interdisciplinary activities. I remember meeting with Bruce Weir and some plant geneticists at North Carolina State University to put together a proposal; and I was telling the geneticists about NISS. One of them listened and he listened and at the end of it said, "Does your mother know what you are doing?" I had to laugh!

It is hard to reconstruct exactly how NISS got up and running in its first couple of years. We had to do things that were not typical in the field. Even the establishment of NISS as an innovation by the field through its societies had little precedence. Critical was the development and funding (by NSF) of the post-doc program that married post-docs to specific projects[8]*. Post-docs in statistics were virtually nonexistent before.*

A large-scale EPA project was initiated.[9] *The Statistical Strategies for Monitoring and Assessing Environmental Changes and Effects funded by the U.S. EPA provided the first demonstration of a unique role for NISS, expanding the range of influence of statistics as a profession by successfully undertaking a research project that could not reasonably be done at that time within academic or other research institutions. A somewhat smaller project in education also was developed with the help, resources and interests of local (Research Triangle) researchers but it also brought in scientists from beyond North Carolina. After these later projects, notably the Transportation project, were either of a scale or of a substance that required major research teams located in places distant from NISS and RTI and frequently with NISS post-docs on site. The result: a crazy quilt of activities at NISS and elsewhere to develop projects that, when funded, were monitored by NISS through frequent meetings and visits. I wish I could reconstruct one of those "virtual institute diagrams" that Ingram and Nancy drew. They probably resembled the structure of what later became NISS projects with teams of researchers at different sites across the country.*

Little, if any, of this would have happened without Alan Karr who joined NISS as Associate Director in 1992. One successful role of NISS from the very beginning—that Alan has been so instrumental in—is being deeply engaged with the federal agencies. I think some of that goes back to Ingram's involvement with the Department of Education as well, also to Lyle Jones' involvement. The subsequent relationships with other federal agencies on fairly deep levels have followed, again with a lot of Alan's effort. And maintaining the sanity of all was Martha Williamson who came on as administrative assistant in the fall of 1991.

Throughout the early years NISS benefitted by the willingness and initiative of a myriad of people to find ways to help NISS and to serve. An example that sticks in my mind: when the NSF in 1992 discussed internally the funding of large-scale interdisciplinary projects Lynne Billard, who was at such a meeting, called and gave us a heads-up, stimulating Alan and me to develop the large-scale Transportation project jointly funded by the Engineering and the Mathematical / Physical Sciences directorate of NSF.

The State of North Carolina's commitment in 1990 of two and one half million dollars in matching funds to construct a building for NISS was rescinded in the spring of 1991 when the state ran into budget problems. In the changing economic and political climate, the North Carolina legislature failed to appropriate the funding approved earlier. Thanks to RTI, space was not a concern initially, but a permanent home for NISS had to be addressed. In 1994, Sherwood Smith, the CEO of Carolina Power and Light and an important figure in the original proposal to site NISS in RTP, took a direct interest. With his help and influence, the legislature and the governor moved to restore the 2.5 million and, miraculously, without a matching requirement.

Recollections: Dan Solomon

For the four of us Department Chairs, there were big commitments in preparing the proposal. It still fell to us (at least at NC State and UNC) to make the case for the universities to support the establishment of NISS; and ultimately it was a departmental commitment. We had to figure out how to turn somebody loose: one person per year, free from responsibilities in the department, and graduate students as well.

I think I was driven to participate and was excited about the opportunity because the vision for NISS was so consistent with my own world view of statistics. I had come to NC State in 1981 because I saw a place that treasured and saw the impact of statistics at its interface with other disciplines, with application areas and with problem solving. So I was primed for being excited about NISS. I would say that through the 1960s and 1970s, academic statistics in the U.S. had moved toward an emphasis on theory and foundation. It was a sort of introspection, looking at its roots and origins and philosophy, to some extent at the expense of the historical role of statistics when it first emerged as a discipline with roles in agriculture and elsewhere. I think what I saw with the Cross-Disciplinary Report *in 1988 was a recognition by IMS that we had come full circle now and that we had built the confidence in the foundations of our discipline so that we're now moving back toward recognizing that our real impact—not to demean the*

[8] Postdoctoral Fellows at the National Institute of Statistical Sciences, funded by NSF 7-21-97 to 9-30-99.

[9] Statistical Strategies for Monitoring and Assessing Environmental Changes and Effects, Funded by the U.S. EPA, 9-1-92 to 1-31-93.

theory or the importance of the theory—is going to be at the applied interfaces.

I don't know exactly how it was for the other chairs, but Barry Margolin, of course, was immersed in biomedical applications and John Geweke was doing interdisciplinary work. Stamatis Cambanis was clearly more of a theoretician, judged both by his department and by his own work. But I think he saw that this was the way that the discipline was moving as well and so he was personally supportive. Of course, when you saw people like Peter Bickel doing transportation[10] *and other sorts of applied work* that *was real evidence that the discipline had moved in this direction toward application.*

Two days stand out in my memory—the day of the Site Selection Team meeting and the Founding Ceremony. At the visit by the Site Selection team, the question came up about NISS' ability to survive in the long-term. John was ahead of the rest of us, and he had built the financial model that made the case of how NISS could run a building and run a program independently by the end of 6 years. John showed that with the original core operating funding from RTF[11] *of $250,000 per year for 6 years, by beginning to attract research grants at a certain rate and charging overhead at a certain rate, NISS would be self-sufficient. I would guess that this weighed heavily in the minds of the ASA-IMS Site Selection Team. On the day they met, to consider the applications, Jonas Ellenberg had said he would call me when they were done. We really didn't know, except by rumor, how many proposals there were or who had put them together. But I remember waiting for this call from Jonas and going to dig in the garden to work off the nervousness. Sometimes we recall vividly the physical situations of events that are important to us—I was sitting on the stoop in the backyard that day in the hot sun when the phone rang; it was Jonas saying that the committee had selected the North Carolina proposal. I was elated!*

The Founding Ceremony was remarkable, too, with all the dignitaries: the Governor of North Carolina, the President of the Universities of North Carolina System. Dick Cyert, President of Carnegie Mellon University was certainly important—and perhaps unexpected because they had also submitted a proposal. The day of the kick-off event, a group of us were having breakfast at the Governor's Inn (nearby hotel) and were talking about who was going to be on the platform, listing the Governor and other dignitaries. Ingram was sitting across the table from me; and he knew that he was going to be a speaker; but he suddenly realized that he hadn't brought a tie with him when he flew out from California. Now, like anyone who knows Ingram at all, we knew well enough that he was fond of wearing cravats, never traditional ties. This worried, actually pained, expression came over his face as he looked across the table realizing he was going to be on the dais with the Governor. So I took off my tie and gave it to him right there on the spot; and he was both pleased and relieved. So if you see photos of Ingram on the stage with the governor, smiling broadly and sporting a bright red tie, it's mine.

Once NISS actually existed, embodying this interdisciplinary vision meant actually getting started. We tossed some words out; I'm not sure how carefully we thought about them, words like "environment," "global implications." But we probably didn't have a specific sort of scientific vision or particular application vision. Certainly in the cross-disciplinary report there were examples in the historical areas in which statistics had played roles in agriculture, medicine and industry; but I don't think we had a specific idea of where to start, so to speak.

I remember an important lesson I learned from Al Bowker at an early Board meeting as we were discussing these sorts of things and working on a strategic plan. We spent countless hours at this big meeting of the 41-member Board doing a lot of word-smithing and arguing about whether something was a goal or an objective and whether it was part of the vision or the mission, and so on. It was an interminable conversation, and it kept revisiting the same ground. Al was there sitting back quietly at a corner of the big square conference table as far as possible from the fray. At one point I guess he just couldn't stand it anymore; and he raised his hand. In the tone of a loving parent he said, "Sometimes it's easier to take a step in the right direction than to say where it is you're going." I thought that was just wonderful; and everybody broke out laughing as what had become a very tense meeting of arguing over trivia was exposed in that moment. Al was a very bright guy.

The first financial disappointment happened almost right away. Of course at the time of the proposal, we had a commitment from the Governor that he would put $2.5 million in matching funds into his budget and would try to lobby the legislature to actually make the appropriation. After that promise and after the right to build NISS was awarded to the Triangle Consortium, the state went through a tough budget period and the legislature rescinded the appropriation. Jerry Sacks took the lead in getting somebody to lobby the legislature a second time around. At the risk of digressing into party politics, I think most of us University folks were connected on one side of the aisle, so our first lobbyist did not have the right kind of clout. I believe it was Sherwood who then pointed us to a lobbyist from the correct side of the aisle (I might say the right side of the aisle?). The original commitment from the Governor had a matching contingency; and we struggled for some time to figure out how to raise the other $2.5 million without making much headway. Ultimately, I think Jerry decided he didn't want to take on a mortgage while trying to work with the legislature to re-appropriate the funds. So originally we were thinking about a $5 million building, and we ended up building a $2.5 million one by getting the legislature not to require a match when they finally refunded the building almost four years later. That was a disappointment because we all had had our hopes up and had gotten into the design of a $5 million building. But now[in 2007] with NISS' growth and with SAMSI, the building will be expanded.

Scaling back the building to half was one kind of disappointment; another was the failure to attract core funding early on. I think that some of us—maybe most of us in North Carolina—had the expectation that it was going to happen, that it was sort of pre-wired that once NISS existed an official proposal for core funding would be successful. When that fell through there were some pretty dark days as we wondered how this institute would survive when the six years of RTF support ran out. Of course, we have and NISS is in great financial health now; but there were some pretty scary days.

If someone were to ask me today whether or how to establish a free-standing science institute today, I would say, "Don't—at least, don't try unless you've got a huge amount of energy and can see your way to a funding model." In retrospect, I think that if it were not for the prospect, which proved false for NISS, of semi-wired core funding, I'm not sure we would have moved forward as aggressively as we did.

Convincing the general statistical community that NISS would not infringe on their access to research support, in particular to NSF funding was a very critical point. It has taken us a very, very long time to get past that. Locally, of course, the Triangle academic statisticians realized that visibility that would accrue to the area and enhance visibility for the departments here. But there certainly was concern in the national academic statistics community that, to the extent that NSF or other funding agencies invested in NISS, that would be at the expense of individual investigators grants that were the lifeblood of academic statisticians. I think it was perhaps the transportation project that was really the major success that NISS had on the research side that not only we but others could point to and say, "Look, this is something that would not have happened without NISS, that is, no individual academic institution would have been to put together a project of that scale with those resources that came from the fund created by of the Intermodal Surface Transportation Act. *I think this fear of diversion of funding has been a real impediment to the adoption of NISS by the national statistics community.*

I think it's obvious and very important to note that the creation of NISS just would not have happened without the leadership of a number of key individuals. On the one hand, Ingram and Jerry I think had to play that important role in creating the vision that we try to pursue. But if it weren't for the energy and the commitment and the optimism of Dan Horvitz, we would never have stuck with putting this proposal together and having NISS where it is today. Thanks, Dan.

[10] NISS project: *Measurement, Modeling and Prediction for Infrastructural Systems*, funded by National Science Foundation.

[11] Research Triangle Foundation of North Carolina.

A Complete Institute

The environmental monitoring project sponsored by U.S. EPA that was initiated in 1992 was just the jumping-off point and NISS milestones followed rapidly each year thereafter. The first NISS Postdoctoral Fellows were appointed in 1993 when NSF funds for institute-wide postdoctoral fellowships became available. A second major project, Analysis, Exploration and Inference in Large Educational Datasets funded by the National Center for Education Statistics (NCES) and NSF that year began a relationship with NCES that continues to expand today involving NISS senior staff and postdocs. The following year, NISS embarked on a third major project, Measurement, Modeling and Prediction for Surface Transportation Systems with $6 million in support over 5 years from the Mathematical and Physical Sciences and Engineering Directorates of the NSF.

Also in 1994, the North Carolina General Assembly approved $250,000 in planning funds for the NISS building; then in 1995 the legislature approved the rest of the promised $2.5 million—without a matching requirement—for construction. The design by O'Brien and Atkins was completed in 1996; ground was broken in 1997 and the building was dedicated in December of the same year. The building itself had to be significantly redesigned to be built with the available $2.5 million to be simultaneously affordable, more functional, and less architecturally flamboyant. In 2005, O'Brien and Atkins were awarded the North Carolina AIA[12] Award for the design of the NISS building.

A new research area was opened in 1996 when NISS partnered with Lucent Technologies on the software analysis project, Code Decay in Legacy Software Systems: Measurements, Models and Statistical Strategies. Simultaneously the postdoctoral program expanded with an award from NSF: Postdoctoral Fellows at the National Institute of Statistical Sciences.

NISS continued to expand its intellectual horizons, collaborating with Los Alamos National Laboratories in 1998 on the TRANSIMS activity-travel project: Statistically Based Activity Generation, funded by the U.S. Federal Highway Administration. With the Digital Government project begun in 1999: A Web-Based System for Disclosure-Limited Statistical Analysis of Confidential Data, NISS established its reputation for leading research at the intersection of statistics, computer science, behavioral, and cognitive sciences. Software analysis research continued with a Focused Research Group project beginning in 2000: Statistical Framework for Evaluation of Complex Computer Models.

The intellectual successes were not equaled by the financial support. A proposal to NSF in 1998 for core funding as a DMS-Institute was unsuccessful, and while projects were directly supported, a continuing source of core funding was needed to support the infrastructure. In effect, NISS had outgrown its initial structure both administratively and financially. Dick Cyert,[13] with the experience of leading a major university, had recognized the need for evolution early on; so that when he was appointed Chair of the NISS Board of Trustees in 1994, he initiated a serious strategic planning exercise. Dick was battling cancer throughout; but he was intensely committed to helping NISS succeed. He put in motion the planning effort to crystallize the mission of the new institute and to broaden activities both by expanding the areas of applications and by increasing the institute's constituency. The process of focusing continued leading to a restructuring that took place subsequently during John Bailar's tenure as Chair. The size of the Board was reduced by half, individual terms were extended so that members could become more involved and more knowledgeable about NISS affairs, and the by-laws were revised to maintain the balance Dan Horvitz had originally built into the structure. Dan's insistence from the outset on a balance between local involvement and national ownership remained paramount, leading to new ways to increase profession-wide engagement with NISS. Most importantly, NISS created an affiliates program open to academic departments, government agencies, and industrial corporations. This program gave the new affiliates the opportunity to participate in charting NISS's course, in articulating goals common to multiple affiliates, in defining specific objectives, and in requesting and/or planning workshops and other activities.

With the new millennium, Jerry Sacks retired, having received the ASA Founders' Award in 1998 "for groundbreaking and pioneering leadership of the National Institute of Statistical Sciences" and his contributions to cross-disciplinary statistical research. Also in 1998, a national search for an Associate Director was launched. The vision for NISS that Alan Karr presented won over the Search Committee by infusing a vibrancy through new projects and a vigorous affiliates program. Alan was appointed to the Directorship of NISS, and new projects continued to be developed, with new efforts in both digital government and software analysis. A new call for proposals from NSF in 2000 initiated afresh the discussion about an NSF-DMS institute. This time, the proposal would be for a separate institute that would also be a Triangle Universities' joint venture with NISS as the fourth parent organization and the new institute would be housed at NISS. History attests to the success of the Statistical and Applied Mathematical Sciences Institute (SAMSI) proposal with Jim Berger as Director and Alan Karr (NISS), Tom Banks (NC State), and Steve Marron (UNC-Chapel Hill) as the initial Associate Directors.

Recollections: Alan Karr

There were multiple reasons that I joined NISS, but the most important one was the attraction to what NISS was trying to do. It was a style of research that I had been engaged in; and I felt very strongly about the importance to statistics of building interdisciplinary bridges, especially to emerging or evolving disciplines. NISS offered an exciting opportunity to try to do this on a different scale and in a different setting than the academic world I was coming from. So I came in the fall of 1992 when NISS' assets were four scattered offices in rented space, an official corporate existence, a substantial bank account but as yet no in-place scientific projects. It was the way, I would guess, that any small organization might begin.

Jerry, as Director, had an Administrative Assistant, Martha Williamson; and Dan Horvitz was committing a lot of his time to help things begin to happen. In the year before I came, I think that Jerry had held three workshops that served both as community outreach kinds of activities to help establish a presence for NISS in the community and as initial forays to develop research projects. The big emphasis in the first couple of years was to get some research going.

[12] AIA: American Institute of Architects

[13] Dr. Richard Cyert, as President of Carnegie Mellon University, had also spearheaded a competing multi-university proposal to site the new institute in Pittsburgh.

The first success was a large project funded by the Environmental Protection Agency that actually had four or five different threads relating to environmental monitoring, Jerry brought in Peter Bloomfield and others including Doug Nychka to develop the research threads and to mentor the first NISS post-docs who worked on this project. This project was the first proof of concept that NISS was able to bring together teams of people who were able to deliver on the vision of interdisciplinary research. This project on the environment was the first hiring of NISS postdocs, setting the pattern for the projects that followed. Dan Horvitz, Ingram Olkin, and Lyle Jones were involved in another very early project on education statistics that helped establish a presence for NISS in the social sciences. A third crucial project in the early days, if by no criterion other than sheer size, was a $6 million research project in transportation. This was funded by a particular program directly under the Director of Mathematical and Physical Sciences at NSF. This large grant gave NISS enough stability fundamentally to get through the first six or seven years both financially and in recognition of NISS' technical capabilities.

This stability was invaluable because along with the developing science there was a very intensive and complex effort to get a building finished, as had been promised in the North Carolina proposal. But I think the building has always been felt to be really important for visibility to give the community a concrete existence for NISS and an associated sense of its tangibility and permanence. The story of the building is very complex because the matching funds from the state of North Carolina had been appropriated before I arrived, and an original design for the building was being created by the architects of O'Brien and Atkins. Then the appropriation was "reverted" because the state was in budgetary difficulties, so the envisioned $5 million was not forthcoming. So there was a very intensive effort involving Jerry, both Dans [Horvitz and Solomon], me and a variety of people in North Carolina who had connections of one sort or another with the legislators to get the appropriation restored. Of course, the original building was envisioned as a five million dollar project; the plan was to secure the two and a half million in matching funds from the state of North Carolina, although where the other two and a half million were to come from had never been carefully specified. To this day I do not know precisely how in this process of restoring the state appropriations the matching provision got removed—whether someone did this deliberately or whether it was legislative oversight. In any case, this removal changed the whole thinking about the building design process dramatically. It was a Board of Trustees decision to take the $2.5 million and build what could be built with those funds on the land in Research Triangle Park that had been set aside for the new Institute.

So in 1992, Jerry, Martha, Dan, and I had four offices in one building (space donated by RTI, whose role was really important because they provided the initial infrastructure including telephone, computer and networking). A year later we moved to contiguous space; after another three years we moved to our own building with space for NISS postdocs and visitors. Happily, by 2007 the building had become too small for all the activities of NISS and SAMSI; so, once again O'Brien and Atkins created a design for expansion to the originally planned size.

Recollections: Jon Kettenring

One of the things that we've all struggled with in statistics is that we've tended to take a very narrow view of what to include under its banner. There's a growing understanding and acceptance now of a much more holistic view of the field and the opportunities such a view offers the profession. Maybe that is another way of describing what NISS is about: capturing and expanding upon the inter-disciplinary mission and drawing a much bigger circle around what we think of as statistics. That enhanced vision is really good for everybody.

To realize a holistic view of statistics, we need the infrastructure to support it. NISS came along at a terrific time; and it's fulfilling a mission that nobody else was in a good position to fulfill. Today, I think it is fair to say that NISS has been able to nicely complement our existing organizations and professional societies. As I said, this could not have happened at a better time. I think it is very much to the credit of the societies that they were behind NISS from the beginning. It's worth remembering that when the six years of original core funding (from RTF) came to an end, NISS was going through a very painful period of transition and was fearful of running out of money. We went back to the ASA, the IMS and ENAR/WNAR to ask them if they were able to help us through this period. It was really heart-warming to see the reaction of all three organizations; each put forth a significant financial contribution. This was really a very important event not only in terms of the money involved but also for the encouragement and support that came with it.

The initial structure of NISS was also playing itself out at the end of the 20th century. Scientifically it was doing very, very well; but financially it was not on solid ground in terms of fulfilling over the long term the mission that NISS had very, very carefully worked out for itself. Together the local universities, the professional societies and especially the Research Triangle Foundation (with one-half million dollars) came to NISS' support.

John Bailar, who was the Chair of the Board during part of this critical period, created a number of task forces to help move NISS forward. I was involved in one on long-range financial planning, as were a number of other people. It was in the course of these financial planning discussions that the idea of an affiliates program for NISS was put forth. The program got going in 2000. One of the advantages of having a robust affiliates program is that it keeps NISS in constant contact with the leading organizations in industry, government, government laboratories and academia. It also provides a natural way of obtaining financial support and setting priorities.

Of course, in the beginning, the affiliates program was nothing. It was just a conversation. As we began to call people, it was really striking how many were willing to get involved in something that had no history whatsoever and required an initial financial commitment on their part. In some sense, they were not only willing, but looking for opportunities for an involvement like this. By the end of the first year, we had about 40 different affiliates who had signed on. Today the program is a very important component of NISS, if not the driving force behind it.

When I think about metrics for success for NISS, the first thought that comes to mind is that it is a significant accomplishment to get academia, government and industry together at the same table talking about common technical interests, needs and problems – and staying at that table to continue the discussion over time. Having said that, I would also say that this is an area where there is considerable potential for further development and growth of the NISS organization as a technical catalyst for the amazingly rich problems that these [affiliate] organizations are facing. You just know that there's a lot more commonality of problems out there and associated methodologies than we've been able to cull out of the discussions so far. Just take a look right now at the different groups involved with NISS. They include most of the major statistical organizations in the federal government, each with its own set of statistical challenges. Look at the list of industrial affiliates and the government laboratory centers and the sorts of statistical problems that they have. Then factor into that all of the expertise in the associated academic institutions and the opportunities for doing exciting statistical research to the benefit of all these affiliates as well as society at large. It's just incredible, and I think we've barely started the process.

Another "unsung success" of NISS is the postdoctoral fellowship program. Really from day one, this has been part of the backbone of NISS, starting from a time when having a post-doctoral fellowship in statistics was hardly "the thing to do." The post-doctoral fellows get very strong mentorship—and the truth of the matter is that Alan has provided a tremendous amount of that. Another advantage for the NISS post-docs is that there are a bunch of them (now an even larger one with the SAMSI post-docs), and I think that they get to know each other well. They share their experiences with each other even if they are not working together as a team. They interact with the many visitors who are passing through, and they can join the numerous workshops put on by NISS and SAMSI. Add to that the statistical activities in the Triangle area, and a post-doc has more possibilities than any one

person can possibly take advantage of! I just think that is an ideal way to initiate a research career. So it is a terrific contribution that NISS has made: there are now nearly 80 of these former post-docs sprinkled around the world and beginning to hold key positions in our profession and in various organizations in each sector: academia, government, and industry.

Uniquely NISS

As NISS became known for completing ambitious projects successfully, that is, on time and technically of very high quality, the number and scope of projects burgeoned. NISS was able to expand and to extend into new areas by relying on partners as mentors for NISS postdocs and as experts in allied fields. A prominent and interesting example was Lyle Jones, a UNC psychometrician. Because his expertise lay in education, he was equipped to provide project leadership and to manage the postdocs working on the first and later on several subsequent education projects. Bio- and biopharmaceutical statistical work began around this time, based on Stan Young's efforts before and after he accepted, part-time, the position of Assistant Director. The early products from NISS projects had been reports and journal publications; gradually software, first in the form of new algorithms, then as full-blown software was added, especially in the computations for microarray data, confidential shared computation, and digital government.

The continuing issue of support for infrastructure prompted development of a proposal to DMS at NSF in response to a new request for mathematical science institute proposals in 1998. The proposal developed the interdisciplinary theme that was the initial vision for NISS, significantly broadening the traditional scope of DMS institutes. The proposal was unsuccessful following a site visit; the cost to NISS was the time and effort spent in its development. Although the decision by NSF not to fund NISS was disappointing, the exercise served to reinforce the unique identity of NISS and to clarify the kinds of activities that were appropriate for NSF funding. Consequently, when proposals were again solicited for funding in 2002, activities were carefully realigned in the process of developing the proposal for SAMSI, which was then successful. As one of four parent institutions for SAMSI, NISS transferred to SAMSI the faculty efforts contributed by the Triangle Universities. At the same time, deferred NISS plans for extended workshops and programs, well-suited to an NSF-DMS institute, were embedded in the SAMSI proposal, to allow the sister institutes to jointly offer the range of activities that the original founders of NISS had envisioned. With the funding of SAMSI, NISS also moved on to the next stage of its existence.

Recollections: Alan Karr

NISS' early projects in transportation and education spawned new projects in those areas; and the national move to digital government opened new opportunities, especially in the areas of data quality and data confidentiality. More and more we have seen problems in statistics like data confidentiality that none of the three pillars—industry, government and academia—really wants to embrace. Here NISS can play a role in bridging among the real owners of the problems and the universities and research organizations where there is the power to do something about them, or alternatively in providing the research venue for making progress. But just as often, I see NISS contribution as a kind of "gap-filling." A good example of this is data quality: I knew relatively little about data quality until March of 2000 at the kick-off meeting of the NISS Affiliates Program, when some of the new NISS affiliates volunteered to talk about problems, and Jon Kettenring put data quality on the table. There was an immediate resonance throughout the non-academic side of the room; the academic side was sitting rather nonplussed, not really knowing how to respond because they didn't readily recognize this as a kind of problems that they were accustomed to dealing with. That's only one of a number of problems that has that nature. If there's going to be progress, I think NISS and groups like NISS have to play a proactive role in trying to fill some of those gaps because they aren't going to get filled on their own.

I really think that perhaps the biggest challenge for NISS is a structural issue: basically it is not possible for an organization to exist solely by doing research for the federal government. If only because of the various ways that indirect costs are calculated, it simply is not possible to recover all the actual indirect costs. There is a distinction here between doing research and doing contract or contract-like work that big federal contractors do, who quite clearly do make a lot of money. So there has been a continuing question whether NISS should seek some kind of core funding from a federal agency, whether that agency would be NSF or a federal department. Other institutes have some kind of core funding that provides not only financial stability but also provides an amelioration of the problems associated with the difficulty in being a break-even operation doing research. In 1998 NISS submitted a very large proposal to NSF as part of a competition to expand the set of Mathematical Sciences Research Institutes, of which there are currently six scattered pretty much coast to coast. Our proposal reached the stage of site visit, but it was not funded. Ultimately the loss to NISS was in opportunity costs of pursuing that proposal rather than writing other proposals that could have generated additional resources. Of course that was painful for NISS; but it did spur the development of a different financial model and reliance on the affiliates program for both support and direction.

Looking back, I think I would say that NSF's concept of an institute and NISS' concept of itself just don't really fit in one organization. For much of what NISS does, the statistical drivers are indirect. They come from the scientific drivers, whether or not the goal is to create new statistical theory and methodology or new algorithms, per se. Instead the goal is to do whatever it takes—new statistical theory, new methodology, adaptation of existing methodology, combination of computational and statistical methods—to deal with the scientific problems. Looking over its entire existence, I've seen NISS have significant impact both on statistics as a discipline and on multiple scientific fields with this mode of operation; and it just is not the same way NSF construes the Mathematical Sciences Institutes. Those have a thrust in theory and methodology and decision-making, but disciplinary science is more of a framing backdrop for the research; the day-to-day driver is the mathematics. What I think was learned from 1998 experience was that it just wasn't going to work for NISS to try to be both of these. In the end, I think trying would not have been good for either. So in my mind, had NISS secured institute funding with that proposal, we might well have had to move away from some of the other things were we doing that I think we're very good at; and that would have been a pity.

Everything we learned in the end was valuable in developing the proposal for SAMSI four years later. That proposal focused on the kinds of formative and catalytic research that are consonant with an NSF institute. The result is a symbiosis, especially with SAMSI in the same building; I think that NISS makes SAMSI unique among NSF's Mathematical Sciences Institutes, and I actually think that NSF understands and appreciates that. At the same time, NISS is free to pursue the kinds of problems that SAMSI could not justify; and we have the full opportunity to "trade problems" either because NISS perceives problems that really require deep analytic foundations or because the progress made through SAMSI research enables implementations for specific applications. Of course, all the postdocs benefit from the enlarged community and from their contact with a much wider range of research activities

and projects. Given that the result is a separate but intimately linked and very synergistic NISS and SAMSI, it's really hard for me to say it played out wrong: we may well have the best of both worlds at this point.

Epilogue

It is now 30 years since the concept of a national institute of statistics first took shape. During the two and a half decades since its founding, NISS has expanded in scope and in size; and nearly 80 postdoctoral fellows have moved from NISS into their careers. During this time SAMSI as an NSF-funded institute has become firmly established and is now in the middle of its second 10-year cycle of renewal.

The sister institutes had outgrown the space in the NISS building; so once again, in 2007 ground was broken for a building addition to almost double the space for their combined activities. Together the two institutes bring more than 1000 visiting researchers to their doors and foster the careers of a dozen postdocs and many more early-career and later-career researchers each year.

All in all, as Ingram Olkin remarked, their thriving existence is really "the story of a miracle in North Carolina."

Gallery of Influential People

Pre-NISS History

Nancy Flournoy, Assistant Professor of Biostatistics, University of Washington in 1984, subsequently Program Director for Statistics at NSF, later Professor Department of Statistics, University of Missouri and Professor of Statistics and of Education, Stanford University

Committee that authored the Cross-Disciplinary Report:

- **Alfred Blumstein**, School of Urban and Public Affairs, Carnegie Mellon University
- **Amos Eddy**, Climatologist, Amos Eddy, Inc., Norman, Oklahoma
- **William Eddy**, Department of Statistics, Carnegie Mellon University
- **Peter Jurs**, Department of Chemistry, University of Chicago
- **William Kruskal**, Department of Statistics, University of Chicago
- **Thomas Kurtz**, Department of Mathematics, University of Wisconsin
- **Gary C. McDonald**, Department of Mathematics, General Motors Research Laboratories Laboratories
- **Ingram Olkin** (Committee Co-Chair), Department of Statistics, Stanford University
- **Ronald Peierls**, Applied Mathematics Department, Brookhaven National Laboratory
- **Jerome Sacks** (Committee Co-Chair), Department of Statistics, University of Illinois
- **Paul Shaman**, Department of Statistics, Wharton School, University of Pennsylvania
- **William Spurgeon**, School of Engineering, University of Michigan
- **Murray Aborn**, Program Director, Division of Mathematical Sciences, National Science Foundation
- **Barbara Bailar**, ASA Executive Director
- **Al Bowker**, Chancellor, University of California at Berkeley, Emeritus
- **Connie Citro**, Statistician at the Bureau of the Census, later National Academy of Science Staff Director for CNSTAT
- **Morris DeGroot**, Professor and Chair of Statistics, Carnegie Mellon University
- **Janet Norwood**, Commissioner of the Bureau of Labor Statistics, US Department of Labor
- **Judy Sunley**, Director of the Division of Mathematical Sciences at NSF, later Deputy Director of Mathematical and Physical Sciences at NSF.

The North Carolina Story

Dan Horvitz, Executive Vice-President and Distinguished Institute Scientist, RTI, later, Interim Director of NISS

Triangle University Department Chairs (1990)

- **Dan Solomon**, Statistics and Biomathematics, North Carolina State University
- **Stamatis Cambanis**, Mathematical Statistics, University of North Carolina
- **Barry Margolin**, Biostatistics, University of North Carolina
- **John Geweke**, Institute for Statistics and Decision Sciences, Duke University
- **Peter Bickel**, Professor of Statistics, University of California at Berkeley
- **Phillip Griffiths**, Provost of Duke University, later Director of Institute for Advanced Study, Princeton University
- **Jim Martin**, Governor of North Carolina
- **Sherwood Smith**, CEO North Carolina Power and Light
- **C. D. Spangler**, President, Universities of North Carolina System

First Steps

Jerome Sacks, Director, NISS and Professor, ISDS, Duke University

Dan Solomon, Chair and Professor of Statistics, North Carolina State University, later, Dean of College of Physical and Mathematical Sciences

Tom Banks, Professor of Mathematics, North Carolina State University

Lynne Billard, Professor of Statistics and Computer Science, University of Georgia

Peter Bloomfield, Professor of Statistics, University of North Carolina

Richard Cyert, President of Carnegie Mellon University

Jonas Ellenberg, Chair IMS-ASA Site Selection Team, National Institutes of Health

Lyle Jones, Professor of Psychology, University of North Carolina, also, Director of L.L. Thurstone Psychometric Laboratory

David Moore, Professor of Statistics, Purdue University

Ron Pyke, Professor of Mathematics, University of Washington
Doug Nychka, Professor of Statistics, North Carolina State University, later Project Leader and Senior Scientist, NCAR
Bruce Trumbo, Professor of Statistics and Mathematics, California State University – Haywood
Edward Wegman, Office of Naval Research, later, Professor of Mathematical Science, George Mason University
Bruce Weir, Professor of Biomathematics, North Carolina State University
Martha Williamson, NISS Administrative Assistant

A Complete Institute

Alan Karr, Associate Director of NISS and Professor of Statistics, University of North Carolina
Jon Kettenring, Executive Director, Telcordia Technologies
John Bailar, Chair and Professor of Health Studies, University of Chicago
James Berger, Chair and Professor, ISDS, Duke University
Steve Marron, Professor of Statistics, University of North Carolina
Stan Young, Assistant Director, NISS

National Institute of Statistical Sciences Timeline

1988

National Science Foundation (NSF)-funded panel of the Institute of Mathematical Statistics (IMS) issues report, Cross-Disciplinary Research in the Statistical Sciences, recommending establishment of "an institute to foster major collaborative efforts between statisticians and other scientists" and to "sponsor related activities, such as workshops, conferences, and training."

1989

Joint committee of the American Statistical Association (ASA) and IMS endorses feasibility of a National Institute of Statistical Sciences (NISS) and solicits proposals for sites.

1990

Proposal accepted from Triangle Universities Center for Advanced Studies, Inc. (TUCASI), with strong participation from Duke University, North Carolina State University, the University of North Carolina at Chapel Hill, and Research Triangle Institute (RTI), to locate NISS in Research Triangle Park, North Carolina.

Founding ceremony held on December 3, 1990, with Richard Cyert as keynote speaker and Governor James Martin in attendance.

1991

NISS established as a nonprofit North Carolina corporation with statistics societies, Triangle universities, TUCASI and RTI as parent organizations.

Research Triangle Foundation grants start-up funding of $1.5 million.

Jerome Sacks appointed Director

1992

Alan F. Karr appointed Associate Director of NISS.

First major project initiated: Statistical Strategies for Monitoring and Assessing Environmental Changes and Effects, funded by the U.S. EPA.

1993

National Science Foundation funds institute-wide postdoctoral program.

First postdoctoral fellows appointed.

Second project initiated: Analysis, Exploration and Inference in Large Educational Datasets, funded by the National Center for Education Statistics (NCES) and NSF.

1994

Third major project begins: Measurement, Modeling and Prediction for Surface Transportation Systems, funded by Mathematical/Physical Sciences and Engineering Directorates of the NSF for $6 million over 5 years.

North Carolina General Assembly approves $250,000 planning funds for NISS building.

1995

Legislature approves $2,250,000 for construction of NISS building.

1996

Design for NISS building completed.

Software development project begins, partnered by Lucent Technologies: Code Decay in Legacy Software Systems: Measurements, Models and Statistical Strategies.

1997

Groundbreaking, construction, and dedication of NISS building.

Large datasets project begins: Pilot Projects to Explore Large Datasets.

GIG award from NSF: Postdoctoral Fellows at the National Institute of Statistical Sciences.

1998

TRANSIMS activity-travel project begins: Statistically Based Activity Generation (funded by US Federal Highway Administration via subcontract from Los Alamos National Laboratory, principal developers of TRANSIMS

Jerome Sacks receives Founders Award from American Statistical Association

1999

Digital Government project begins: A Web-Based System for Disclosure-Limited Statistical Analysis of Confidential Data

2000

Affiliates program established

Alan Karr appointed Director

Focused Research Group project begins: Statistical Framework for Evaluation of Complex Computer Models

2001

Proposal for Statistical and Applied Mathematical Sciences Institute (SAMSI) submitted and awarded

Initial Sacks Award presented to Elizabeth Thompson

NISS receives ITR award from NISS for research on lightweight instrumentation of software

NISS performs data quality research for BTS

2002

SAMSI has its grand opening; NISS is one of the founding members

Hiring of Stanley Young as Assistant Director

2003

Second NSF-funded data confidentiality project begins

2004

SDL for geospatial image data project begins

Studies for National Center for Education Statistics commence

EPA funded project on global climate change begins

2005

NISS Distinguished Service Awards established; initial awards presented to Albert Bowker, Daniel G. Hotvitz, Janet Norwood, and Martha L. Williamson

Affiliates Program receives SPAIG Award from ASA

NISS Building receives Design Award from NC Chapter of AIA

Nell Sedransk joins NISS as Associate Director

2006

Expanded activity in education statistics

NISS celebrates 15th anniversary with multiple events

Survey cost modeling project begins

New areas of data confidentiality are explored, including Bayesian characterization of transparency risk and utility

New research initiatives include: experimental analysis of algorithms, evidentiary statistics, proteomics, and biomedical imaging

New Researcher Fellowships presented to Scott Holan (University of Missouri) and Sherry Wang (SMU)

2007

Affiliate working groups initiated include: QT for pharmaceuticals, Data Confidentiality, and Data Quality

SAMSI receives renewal of funding from NSF

Strategic positioning study completed and adopted by NISS Board of Trustees

2008

NISS building expansion complete. Addition of 11,782 square feet.

Explorations Workshops initiated

Research initiated with the National Cancer Institute's CP Tech

2009

NISS-NASS Research in Residence Program begins

NISS, in collaboration with the Institute for Transportation Research and Education (ITRE), in conjunction with Kittelson & Associates, Inc. (KAI), Berkeley Transportation Systems (BTS), the University of Utah, and Rensselaer Polytechnic Institute (RPI) begins research on Establishing Monitoring Programs for Travel Time Reliability.

2010

Work on the Online Reading Comprehension Assessment (ORCA) Project looking at schools in Maine, Connecticut, and North Carolina begins.

2011

Project Talent contract is issued with ESSI and AIR

2012

Triangle Census Research Network contract is issued by the National Science Foundation

NISS and Cornell are co-awarded to be the NSF-Census Research Network Coordination Office

2014

Alan Karr resigns as Director of NISS

Nell Sedransk becomes Acting Director of NISS

NISS Projects

1991

Statistical Strategies for Complex Computer Models

National Science Foundation - Division of Mathematical Sciences

1991–1994

Statistical Strategies for Accelerating Design of Products

Semiconductor Research Corporation

1991

1992

Statistical Strategies for Monitoring and Assessing Environmental Changes and Effects

U.S. Environmental Protection Agency

1992–1996

Estimation of Extreme Probability Distribution Tails

National Science Foundation

1992–1993

Mathematical Sciences Cross-Disciplinary Workshops in Statistics
National Science Foundation - Division of Mathematical Sciences
1992–1993

Computer Aided Drug Design Workshop
FMC (Glaxo Research Computing Group)
1992

1993

Mathematical Sciences - Fellows for Cross-Disciplinary Research in Statistics
National Science Foundation
1993–1998

Analysis, Exploration, and Inference in Large Educational Datasets
National Science Foundation and Becton Dickinson Research Center
1993–1997

Workshop on Statistics and Materials Science: Microstructure–Property–Performance Relations
National Institute of Standards & Technology
1993–1994

1994

Measurement, Modeling, and Prediction for Infrastructural Systems
National Science Foundation
1994–1999

1996

NISS Building
State of North Carolina Building Appropriation
1996

Education Statistical Analysis
MPR Associates
1996–1999

Code Decay in Legacy Software Systems: Measurement, Models, and Statistical Strategies
National Science Foundation, North Carolina School of Science and Mathematics
1996–1998

National Assessment of Educational Progress
National Center for Education Statistics
1996

1997

Postdoctoral Fellowship Program at the NISS
National Science Foundation
1997–2001

Indices of Environmental Status and Trend
U.S. Environmental Protection Agency
1997–2000

Statistically Based Activity Generation
Los Alamos National Laboratory
1997–1999

Evaluation of TIMSS/NAEP Linkage
National Center for Education Statistics
1997–1998

Clean Air Status and Trends Network
U.S. Environmental Protection Agency
1997–1998

Applied Statistical Problems
British Petroleum
1997

1998

Digital Government: A Web-Based Query System for Disclosure-Limited Statistical Analysis of Confidential Data
National Science Foundation
1999–2003

Development of a Web-Based Query System for Disclosure-Limited Statistical Analysis of Confidential Data
National Agricultural Statistics Services
1999–2002

Pilot Projects to Explore Large Datasets
National Science Foundation
1998–2001

PM Research
NRCE Collaboration: University of Washington
1999–2001

Exploring Statistical Adjustment of Results from the Trial State Assessment Analysis
American Educational Research Association
1998–1999

ITS Integration of Real-Time Emissions Data and Traffic Management Systems
National Academy of Sciences
1998–1999

Workshops on Statistics and Information Technology
National Science Foundation
1999–2001

Research Workshop on Missing Data
National Center for Education Statistics
1998

2000

Framework for Statistical Evaluation of Complex Computer Models
National Science Foundation
2000–2004

Response and Presentation for Environmental Information
U.S. Environmental Protection Agency
2000–2003

History of NAEP
National Center for Education Statistics; Collaboration - American Institutes for Research
2000–2002

Mathematically and Statistically-Based Validation Systems
General Motors
2000–2002

Researching Web Merchandising
Visual Insights
2000–2001
Trip Generation and Lifecycle Relationships
North Carolina Department of Transportation and North Carolina State University
2000–2001
Three Way Analysis
Glaxo
2000
NAEP Inclusion Strategies Project
National Center for Education Statistics; Collaboration - American Institutes for Research
2000

2001

SAMSI Start-Up
Kenan Institute; Collaboration - North Carolina State University
2001–2007
Variability Sensitive Measures of Performance
U.S. Bureau of Transportation Statistics; Collaboration - North Carolina State University
2001–2002
Statistical Methodology for Measuring and Improving Data Quality
U.S. Department of Transportation
2001

2002

Collaborative Research: ITR: Acquiring Accurate Dynamic Field Data Using Lightweight Instrumentation
National Science Foundation
2002–2008
Digital Government: Data Confidentiality, Data Quality, and Data Integration for Federal Databases: Foundations to Software Prototypes
National Science Foundation
2002–2008
NCES Confidentiality Edits
U.S. Department of Education; Collaboration - American Institutes for Research
2002–2005
Extreme Value Theory for Global Climate Change and Atmospheric Pollution
U.S. Environmental Protection Agency
2002–2005
Federal Affiliates Postdoctoral Program
U.S. Census Bureau
2002–2004
Methods for Data Quality Assessment and Measurement
U.S. Department of Transportation
2002

2003

In Silico Virtual Drug Screening Process
Hereditary Disease Foundation
2003–2005
Joint Postdoctoral Fellowship
CIIT
2003–2005
Data Driven Prognostics
Golden Helix, Inc. and U.S. Air Force
2003–2004
Statistical System for Validation of Computer Models
General Motors
2003–2004
Pilot Course on Math Model Validation Strategy
General Motors
2003
Math Model Validation Course
General Motors
2003
Panel to Review Measurement of High School On-Time Graduation and Dropout Rates
National Center for Educational Statistics
2003–2004
SAMSI Program: Directorate Liaison
Data Mining and Machine Learning
2003–2004

2004

Collaborative Research: Dynamics for Social Networks Processes: Comparing Statistical Models with Intelligent Agents
National Science Foundation
2004–2006
DMUU: Statistical Disclosure Limitation for Geospatial Image Data
National Science Foundation
2004–2006
NPEC Title IX Best Practices Data Manual
American Institutes for Research
2004–2006
Math/Computer Models for Simulating Vehicle Performance
General Motors
2004–2005
Participation Rates in International Assessments
American Institutes for Research
2004–2005
Effects of Data Integration and Data Quality on Data Mining
Electronic Frontier Foundation
2004
Expert Panel on Dropout Rates and Data
National Center for Education Statistics
2004
SAMSI Program: Scientific Coordinator
Latent Variable Models in the Social Sciences
2004–2005

2005

Comparative and Web-Enabled Virtual Screening
National Institutes of Health; Collaboration - North Carolina State University
2005–2007

General Data-Analysis: Tools to Relate Chemical Diversity to Biological Outcomes
National Institute of Health; Collaboration - MIT, Harvard University
2005–2007
PowerArray
GlaxoSmithKline
2005–2006
Evolving Research Needs in Data Confidentiality - NCHS Workshop
Centers for Disease Control and Prevention
2005–2009
Workshop on Mathematical Geosciences
National Science Foundation
2005–2006
SAMSI Program: Directorate Liaison
National Defense and Homeland Security
2005–2006

2006

NCES Center-Wide Review
SSP Strategic Planning for Review of NCES Data
SSP Quality Profile Review
Senior Management Overview
American Institutes for Research
2006–2011
Technical Research, Report, and Review
American Institutes for Research
2006–2007
Statistical Standards Initiatives: Effect Size Task Force
American Institutes for Research
2006
Special Statistical and Psychometric Studies
American Institutes for Research
2006
Evolving Research Needs in Data Confidentiality
Workshop with the National Center for Health Statistics
2006–2007
SSP Confidentiality Workshop
American Institutes for Research
2006
SAMSI Summer Program: Scientific Coordinator
Multiplicity and Reproducibility in Scientific Studies
2006
SAMSI Program: Directorate Liaison
High-Dimensional Inference and Random Matrices
2006–2007

2007

Review of NCES Data Collection Efforts
American Institutes for Research
2007–2011
SSP Technical Support
American Institutes for Research
2007–2010
Evaluation and Analysis of QTc and ECG
Merck
2007–2008
Optimizing Measures of Cardiovascular Function through Statistical Analysis and Computer Modeling
Eli Lilly and Company
2007–2008
Postdoctoral Fellow in Bioinformatics and Statistics
Hamner Institutes for Health Sciences
2007–2008
Applied Statistical Research
Raytheon Integrated Defense Systems
2007
NAEP Design, Analysis, and Special Studies Support
American Institutes for Research
2007
Data Confidentiality Conference
Centers for Disease Control and Prevention
2007–2008
Technical Writing Workshop for New Researchers
National Science Foundation; Collaboration - American Statistical Association
SAMSI Program: Directorate Liaison
Risk Analysis, Extreme Events, and Decision Theory
2007–2008

2008

Clinical Proteomic Technology for Cancer Initiative
National Science Foundation; Collaboration - Broad Institute of MIT and Harvard, Memorial Sloan-Kettering Cancer Center, Purdue, UC-San Francisco/Lawrence Berkeley National Laboratory, and Buck Institute Vanderbilt University School of Medicine.
2008–2011
Prediction and Risk of Extreme Events Using Mathematical Computer Models of Geophysical Processes
National Science Foundation
2008–2011
Survey Costs and Disruptions
National Center for Health Statistics
2008–2009
Quantitative Methods in Defense and National Security Conference
2008
NAEP Design, Analysis, and Support - Full Populations Estimates
American Institutes for Research
2008
Exploration Workshop on Data Sharing and Data Availability
Collaboration - National Academy of Science
2008
Exploration Workshop on Agent-Based Modeling: Commonalities in Unconnected Problems - Applications Driving Theory
2008
International Total Survey Error Workshop
Multiple Error Sources and Their Interactions
2008
Technical Writing Workshop for New Researchers
National Science Foundation; Collaboration - American Statistical Association
2008

SAMSI Summer Program - Directorate Liaison
Meta-Analysis: Synthesis and Appraisal of Multiple Sources of Empirical Evidence
2008

2009

Project Talent
American Institutes for Research; Collaboration - Science Resource Statistics
2009–2014
Assessing Online Reading Comprehension (ORCA)
U.S. Department of Education-Institute of Education Sciences; Collaboration - University of Connecticut, Pennsylvania State University
2009–2012
Bayesian Methods in Syndromic Surveillance: CAR Model and Computational Implementation
National Science Foundation; Collaboration - Duke, Clemson, University of Georgia, University of South Carolina
2009–2011
Establishing Monitoring Programs for Travel Time Reliability
Transportation Research Board; Collaboration - North Carolina State University
2009–2011
Maps and Graphics for Education Data
National Center for Education Statistics
2009–2011
NISS-NASS Cross-Sector Research Program:
Multivariate Imputation of Phase III Agricultural Resource Management Survey Data
Number of Small Farms from NASS Sampling Frames
Estimation in Support of Crop Production Forecasts and Estimates
USDA, National Agricultural Statistics Service
2009–2011
Statistical Analysis and Predictive Modeling for OMICS Technology
Hamner Institutes for Health Science
2009–2011
Postsecondary Access and Choice
National Center for Education Statistics
2009–2010
Tracing School Principals
National Center for Education Statistics
2009–2010
Configuration and Data Integration for Longitudinal Studies
National Center for Education Statistics
2009
Nonresponse Bias Analysis
National Center for Education Statistics
2009
Task Force on Computer Adaptive Testing
National Center for Education Statistics
2009
Exploration Workshop Exploring Statistical Issues in Financial Risk Modeling and Banking Regulation
Office of the Comptroller of the Currency
2009
Exploration Workshop II: Financial Risk Modeling
Office of the Comptroller of the Currency
2009
International Total Survey Error Workshop
The Total Survey Error Concept: Uses and Abuses
2009
Technical Writing Workshop for New Researchers
National Science Foundation; Collaboration - American Statistical Association
2009
SAMSI Program - Scientific Coordinator
Stochastic Dynamics
2009–2010

2010

Evaluation and Development of Community Wage Index
National Center for Education Statistics
2010–2015
Analysis of NSF Post Graduation Survey Data
American Institutes for Research
2010–2013
Survey Research in Support of SRS/National Science Foundation
National Science Foundation
2010–2012
Synthetic Longitudinal Business Database
U.S. Census Bureau
2010–2012
Data-Enabled Science Workshop
National Science Foundation
2010–2011
Explorations Workshop on Computational Advertising
2010
International Total Error Survey Workshop
The Ongoing Evolution of Survey Methodology and the Impact on Total Survey Error
2010
Survey Costs Workshop
National Center for Health Statistics
2010
Technical Writing Workshop for New Researchers
National Science Foundation; Collaboration - American Statistical Association and Institute of Mathematical Statistics
2010
SAMSI Program - Directorate Liaison
Analysis of Object Data
2010–2011

2011

Beginning Teacher Longitudinal Study Survey Support
American Institutes for Research
2011
International Total Survey Error Workshop
2011
Technical Writing Workshop for New Researchers
National Science Foundation; Collaboration - American Statistical Association and Institute of Mathematical Statistics
2011

2012

NSF-Census Research Network Coordination Office
National Science Foundation; Collaboration - Cornell University, Carnegie Mellon University, University of Colorado at Boulder, University of Tennessee, Duke University, University of Michigan, University of Missouri, Ohio State University, University of Nebraska, and Northwestern University
2012–2017

Triangle Census Research Network
National Science Foundation; Collaboration - Duke University
2012–2017

Longitudinal Data Analysis Postdoctoral Fellowship
American Institutes for Research
2012–2014

Distributed Computation for Statewide Longitudinal Data Systems (SLDS)
National Center for Education Statistics
2012–2013

Analysis of ATM Failure Data
Diebold
2012

World's Simplest Survey Microsimulator
2012

International Total Survey Error Workshop
Total Survey Error: Past, Present, and Future
2012

Technical Writing Workshop for New Researchers
National Science Foundation; Collaboration - American Statistical Association and Institute of Mathematical Statistics
2012

SAMSI Program - Directorate Liaison

Data-Driven Decisions in Healthcare
2012–2013

2013

Technical Research Support in Statistical Computation
American Institutes for Research
2013–2014

Analysis of Patient Mortality Data and Nursing Staff
Carillon Clinic
2013

Data Utility–DAS Functionality Tradeoffs, Linkage to Other Datasets
National Center for Education Statistics
2013

Data Quality Evaluation for Teacher Compensation Survey (TCS)
American Institutes for Research
2013

NCSES Survey Follow-On
National Center for Science and Engineering Statistics
2013

International Total Survey Error Workshop
Evaluating Errors and Other Measures
2013

Technical Writing Workshop for New Researchers
National Science Foundation; Collaboration - American Statistical Association and Institute of Mathematical Statistics
2013

2014

Technical Support and Research Mentoring
NASS
2014–2018

Expert Panel on Gainful Employment - Standards

Expert Panel on Survey Content
National Center for Education Statistics
2014–2015

International Total Survey Error Workshop
Total Survey Error: Fundamentals and Frontiers

2014

Technical Writing Workshop for New Researchers
National Science Foundation; Collaboration - American Statistical Association and Institute of Mathematical Statistics
2014

2015

NISS-NASS Postdoctoral Fellowship Program
2015–2017

Expert Panel on Statistics on Women and Beginning Farmers in the USDA Census of Agriculture
NASS
2015

International Total Survey Error Workshop
Survey Quality and the Challenges of Big Data
2015

Technical Writing Workshop for New Researchers
National Science Foundation; Collaboration - American Statistical Association and Institute of Mathematical Statistics
2015

SAMSI Program - Directorate Liaison

Statistics and Applied Mathematics in Forensic Science
2015–2016