



## Testimonials from the Field

*"It is very inspiring to see that the instructors treat the students as equals.*

*This creates a more open teaching environment where everybody feels free to ask questions and to participate."*

– Ecuador workshop participant

*"If I would have known this three years ago, I would be much farther ahead."*

– Ana Maria Xet-Mull, Panama writing workshop participant

*"We are so impressed!*

*When SSI said that they would bring all the reagents necessary, they brought ALL the reagents necessary — everything.*

*This is the best workshop we have EVER had."*

– Juan Carlos Gallegos, Colombia workshop director

*"In one short week, participants made months of progress on their manuscripts!*

*It was wonderful to see the isolation that normally shrouds the act of paper-writing yield to the supportive atmosphere of constructive criticism and communal effort."*

– Jennie Dorman, Guatemala writing workshop instructor

## SSI Incorporated in Nicaragua for Dengue Study 3-Year, \$2M Project Takes Science to the Next Level

**M**anagua, Nicaragua — In a significant development, SSI has been incorporated locally in Nicaragua to administer a 3-year, \$2.3 million study on the transmission and clinical manifestations of dengue in children that paves the way for eventual testing of a safe tetravalent vaccine. Opening a subsidiary office in the country where our work began in 1988 and administering a study of this magnitude takes SSI's role as a model for technology transfer to the South to a new level.



Dengue is the most important mosquito-borne viral disease affecting humans, and dengue fever and dengue hemorrhagic fever/dengue shock syndrome have emerged as major public health problems, particularly in Southeast Asia and Latin America. An effective, tetravalent vaccine could dramatically improve the fate of millions of people who are affected by this disease. Recent studies indicate that by age 10, 90-95% of children in Managua have been infected with one or more of the four dengue virus serotypes, and up to one in four children is infected with dengue virus each year. This study follows a cohort of 3700 children aged 2-9 at high risk for dengue in Managua's densely-populated, low to mid-socioeconomic status District II near the *Lago de Managua*. The response from the community has been overwhelmingly enthusiastic. The original objective to recruit 3500 study participants was easily surpassed during the three-week recruitment period, and since the study's inception, visits to the Health Center have increased by 45%.

*Participants receive their ID cards. Up to one in four Nicaraguan children is infected with dengue virus each year.*

*continued on page 2*

## Latin America Centers of Excellence Taking Off

Thanks to generous support from the V. Kann Rasmussen Foundation (VKRF), SSI has evolved its training program further to concentrate resources on outstanding partner institutions and researchers in Latin America. Taking our success in more than 15 years of collaboration with Nicaragua as the model, in 2003 and 2004, SSI returned to groups at select previous training sites with the goal of developing them into Centers of Excellence in their fields of research on priority infectious diseases.

In addition to continuing to search out promising new researchers from numerous countries for training, SSI solidified ongoing relationships with scientists at the *Instituto Nacional de Higiene* and the *Universidad San Francisco* in Ecuador, the *INDICASAT* in Panama, the *IICS* in Paraguay, and *INCAP* in Guatemala. Our plan is to invest in the long term in the capabilities of these researchers and facilities by providing workshops and ongoing material aid and mentoring support, as well as grants for meritorious research projects generated by participants, since such projects ensure that the learning in the workshops translates into the practice of science. In keeping with this plan, in 2004, we organized follow-up workshops at each of the five institutions, sent large material aid shipments, and are currently reviewing grant proposals from these sites and others for funding.

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## Success Story: SSI Partner Mauricio Espinel

SSI partner Dr. Mauricio Espinel, a native of Ecuador, has been working in the indigenous community of Esmeraldas in the northern part of the country as a researcher and public health worker since 1992. He served as the director of the onchocerciasis control program for two years and as the director of the local health center for three years, growing the health center from a two-person operation to a six-doctor staff with a full administration team, a high level of community participation, and support from outside organizations from the local church to PAHO. As a member of the faculty of both the Universidad Central in Quito and the Universidad San Francisco de Quito, he has also conducted extensive research surrounding the construction of the first major road into Esmeraldas, which began in 1997. His studies have addressed issues of public health importance to the community, including an SSI-supported study on Chlamydia in communities located at different distances from the road and an ongoing NIH-funded study, in collaboration with scientists at UC Berkeley, on the impact of development in this area on the spread of diarrheal diseases.



Mauricio Espinel

Construction of the road has resulted in serious changes in Esmeraldas — which until recently was basically inaccessible — such as the introduction of money and the use of land for mass production by new immigrant populations, or "colonos". Both environmental and social changes are in turn impacting health, for example, increasing the incidence of both Chlamydia and malaria in communities closer to the road. At the same time, the onchocerciasis (parasitic disease also known as "river blindness") eradication program has experienced a tremendous boost due to the increased access to communities that the road provides. Witnessing these examples, Mauricio has concluded that development will always have both positive and negative effects; the task of development programs should be to anticipate those that are negative and include measures to diminish them.

SSI began working with Mauricio in 1994, when Eva Harris and Josefina Coloma conducted a series of technology transfer workshops that introduced and helped implement molecular biology techniques in the country. Since then, Eva and Josefina have kept in close contact with Mauricio. SSI has helped build a strong molecular biology team at USFQ that is coaxing both PAHO and WHO to become more involved in Ecuador. Mauricio delights in showing young people at the university how high technologies can serve to benefit the poorest of the poor.

**"Having the support always there from SSI has helped me to continue working toward the dream of better health in my country. "**

*Without the consistent emotional and technical support SSI has provided over the years, Mauricio insists he would not have been able to continue with his work. "Unfortunately, with public health, the results take a long time," he said. "But in our countries, the kind of support needed is not coming from the government. So, your dream of having better health in your country has to confront the reality of your situation. Having the support always there from SSI has helped me to continue working toward that dream."*

## SSI Incorporated in Nicaragua

This landmark study, a collaboration between the Division of Infectious Diseases at the University of California, Berkeley and the Ministry of Health of Nicaragua and supported by the Gates-funded Pediatric Dengue Vaccine Initiative (PDVI), brings together the Nicaraguan laboratory, epidemiology, and clinical sectors in an unprecedented collaboration, building scientific capability and infrastructure to a level previously out of reach. Designed initially for three years, the study should provide detailed and well-documented epidemiological data linked with biologic specimens from a pediatric population in a highly dengue-endemic Latin American setting that will enable numerous questions about the pathogenesis and epidemiology of dengue to be addressed.

"The extremely high quality and the magnitude of this study are rarely seen in Central America," remarked Dr. Eva Harris, SSI's President and Assistant Professor of Infectious Diseases at UC Berkeley, who initiated and has led SSI's close work with scientists in Nicaragua. "In the future, Nicaragua will be perceived, accurately, as being capable of implementing this caliber of research."

Initiating the project has required an enormous investment in human and material resources, which will benefit the researchers and the community well into the future. More than \$150,000 in equipment has been purchased and installed, two vehicles have been acquired, major renovations have been made at the health center, and a new building for -70°C freezers for the National Reference Laboratories is being constructed, among other infrastructure improvements. Sixty-five em-

*continued from page 1*

ployees are on the project's payroll, including 15 FTEs in Nicaragua.

Numerous trainings have been undertaken in order to comply with international standards of Good Laboratory Practice (GLP) and Good Clinical Practice (GCP), with Standard Operating Procedures for all study processes. These activities are administered by SSI-Nicaragua, which manages everything from complicated labor law to vehicle maintenance, importing of materials, negotiations with local businesses, and national and international NGO bookkeeping requirements.

The immediate benefits for the community are also significant. Three of the project's physicians were sent to Thailand to be trained in the management of severe dengue cases. Feedback from this visit is being incorporated into practices at both the hospital and health center and will most certainly improve case management in Nicaragua. Four new physicians and extended working hours of the nursing staff have enabled the health center to provide 24-hour attendance to its 68,000 constituents. Community-wide education campaigns on the prevention, control and symptoms of dengue are underway. Lastly, the study vehicle stationed at the Health Center serves as an around-the-clock ambulance.

For SSI, opening an office in Nicaragua, one of the hemisphere's poorest countries, is the beginning of an exciting new chapter. In keeping with our mission, we have increased our scientific capacity-building there to address a disease that places a heavy burden on the poor and receives little funding for research and prevention.

## SSI Building Centers of Excellence in Research

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According to SSI's Program Director Josefina Coloma, this increasingly sophisticated approach "makes SSI's work more sustainable. We work long-term with researchers who have demonstrated exceptional performance and commitment to their communities, and we help to develop them into leaders in their field over time by providing them with whatever support they need."

Coloma's work since 2000 with the groups in Ecuador also serves as a guide. She began by introducing molecular techniques for dengue diagnosis and typing in an SSI Peer Training Workshop; since then she has made annual training visits and provided year-round mentoring, material aid, and grant-writing support. Under her guidance, SSI has funded researchers at both institutions. Most recently, she and volunteer Dianna Edgil spent a week in June with researchers at the INH, helping them perfect their tissue culture and virological techniques. As a result of SSI's efforts, the Reference Laboratory at the INH in Guayaquil has implemented technologies introduced in workshops for the national surveillance of dengue and has adapted and applied molecular (PCR-based) assays for diagnosis of other diseases.

In 2004, SSI also added a new recruit to the program. We initiated a partnership with the *Universidad de Antioquia* in Medellin, Colombia by introducing differential diagnosis of dengue and yellow fever in a July workshop. The university had contacted SSI in response to a yellow fever outbreak and gathered a group of participants from all over the country for training. In addition to incorporating the new diagnostic tools, participants used the workshop to establish a nation-wide virology network. One of the highlights was a participant-initiated meeting they called the "Lluvia de Ideas," in which they discussed the needs and feasibility of establishing several nation-wide projects. As with SSI's other partners, the group at the university has the potential to become a leader in infectious disease research in the region. The VKRF will continue to support the Centers of Excellence program in 2005 and 2006.



SSI Instructor Fernando Valle teaches molecular typing of *M. tuberculosis* strains to students in Panama

## 2004 News Briefs

### PAHO Teams up with SSI, Adopts Training Model

PAHO and SSI teamed up to undertake a long-term initiative in Paraguay, co-sponsoring a scientific manuscript-writing workshop in June at the *Instituto de Investigaciones en Ciencias de la Salud* (IICS) in Asunción, where SSI has been working since 2001. SSI was able to contribute its unique format, as PAHO had never taught manuscript-writing before; PAHO was very pleased with SSI's training model. The two organizations have continued to strengthen scientific infrastructure at the IICS by providing equipment and training to each of the three departments that participated. We are enthusiastic about an ongoing partnership that will multiply, rather than duplicate, our efforts. The effort is particularly important in Paraguay, which does not receive much international attention or funding.

### SSI Grants Initiate Hepatitis C Projects in Egypt

Many of the participants in the January 2004 grant-writing workshop at the National Hepatology and Tropical Medicine Research Center in Cairo submitted the resulting proposals to SSI for funding. In August, SSI selected six projects based on reviewers' assessment of their feasibility and merit. Several of the studies focus on improving hepatitis C treatment protocols for the population of Egypt, where the virus has a different genetic profile than in other countries. Other projects are investigating various ways in which the disease can be spread within families. Important work is also being done to understand the debilitating health conditions associated with HCV infection, including liver cancer.

### SSI Leads the Way for Science in Developing Countries

The National Academy of Sciences (NAS) called on SSI as a leader in technology transfer to guide them in exploring genomics applications within developing countries. SSI's message about the importance of doing research that is relevant to local issues resonated strongly with the NAS, which is currently generating a report to be published on best practices in capacity-building programs. Josefina Coloma attended a meeting of the US National Sciences Foundation in Ecuador, where she helped draft a report on the future of biotechnology in Latin America. Eva Harris gave a very well-received plenary on SSI's work at the World Summit on Health Research in Mexico City in November. Finally, both the *EMBO Reports* and the *British Medical Journal* featured SSI's work. For full copies of the articles, please visit [www.ssilink.org](http://www.ssilink.org).

### Larrick Fund to Support Latin American Researchers

Thanks to the generosity of SSI Board Member Jim Larrick and friends and family who have donated more than \$12,000 to the Jason Wan-Shan Larrick Memorial Fund, SSI will provide seed funding for outstanding projects generated by Latin American researchers. The fund was created in honor of Jim's 18-month-old son, who died in a tragic accident earlier this year. It was Jim's desire that this fund be developed to carry on his own dedication to extending the benefits of developments in medical science to people in developing countries. The 2004 Jason Larrick Award goes to Manuel E. Baldeón, an Ecuadorian researcher studying the effect of infant formula with probiotics on intestinal microbiota.

## SSI Volunteers, continued from page 5

giene – INH) in Guayaquil, which is actively used by not just one, but all INH research groups. In Paraguay, SSI partner Leticia Franco and colleagues have been able to move their research on dengue and leishmaniasis forward using a whole room stocked with donated equipment, set up according to SSI protocols and standards and made available to researchers from other disciplines.

Scientific Director Maria Elena Peñaranda had the opportunity to visit the completed space in Paraguay last summer during SSI's writing workshop there.

"It was beautiful!" she reported. "They are so proud of it. The room is very well-kept; people are required to sign up to use it."

In keeping with SSI's mission to develop Centers of Excellence in Latin America, the recipients of the donated equipment are able to form a nucleus of researchers. The presence of the equipment offers them a place to do their research.

### Small Grants for Research

Likewise, SSI's program to support our trainees in designing well-planned research projects could not function without the countless hours put in by volunteer reviewers. Twice this year, volunteers have stepped in to help our trainees improve their proposal-preparation by conducting two rounds of reviews: the first to offer constructive criticism, and the second to choose the most meritorious proposals for funding.

SSI has been overwhelmed by the enthusiastic response on the part of our volunteer reviewers. The process of conducting one round of review for one grant takes between four and six hours. Many of our reviewers, including Milton and Sondra Schlesinger, Eric Delwart, Queenie Tan, Wayne Enanoria, and Diana Palmeri, routinely offer to review multiple grants, perform a thorough job on each one, and return them promptly within a two-week time period. All have offered to work with the applicants directly, which has occurred so far in four instances.

The help the volunteers afford SSI is invaluable. "Conducting the reviews takes good judgment, knowledge of the specific discipline and the scientific process in general, identification with the SSI mission, and, above all, dedication," Maria Elena commented. "It is safe to say that we could not conduct the small grants program without the help of our reviewers."

Most importantly, the benefits to our partners are tremendous. Research proposals address important public health issues ranging from risk factors for mother-to-child transmission of Hepatitis C in Egypt to biofilms in rivers as a possible survival niche for pathogenic leptospira in Ecuador. Those diligent scientists who incorporate the reviewers' comments emerge with a proposal that measures up to international standards.

"These scientists get the unique opportunity to improve their proposals by incorporating the comments of the reviewers," said Maria Elena. "This opportunity increases their chances of being funded by SSI and by outside agencies."

## SSI Thanks

Our Volunteers, who have given freely of their time:

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rick, Robert Metcalf, Ichiro Matsumura, Arthur Pardee, Elisabeth Raleigh, John Ritchie, Naomi Sager, Daniel & Rina Saint-James, Edmond & Edith Schonberg, Bernice Weissbourd, Joan Wilson-Chan, Keith Yamamoto. **Donors:** Margaret Arculus, Nome & Janis Baker, Robert Balint, Michele Barocchi, Jenny Berline, Richard & Barbara Booth, Garrett Brown, James Burden, Cheri Burk, Ronald & Lilian Cape, Thomas Carlson, Pengchin Chen, Thomas Collet, Josefina Coloma, James Cronander, James & Elizabeth Crowe, Eric Delwart, Fred Dorey, Ihsan Dujaili, Tom Evans, Jean Feagin, Bill & Leslie Gitlin, Ellen Goode, Richard Gosselin, Barbara Gottschalk, Vi Gottschalk, Tom Hall, Matthew Hall Strelau, Kate Hanham, Eva Harris, Ed & Sue Hekman, Christopher Henley, Paul Herzmark, Russell Higuchi, Reiko Irie, Gordon Irlam, Todd Jailer, David Kiesel, Koichi & Hiroko Kato, Russell Knapp, Jane Koehler, Barbara Krummel, Deborah Lans, Vishwanath Lingappa, Stuart & Elisabeth Lipton, Sally Liska, Don Lum, Joshua Markel, Leticia Márquez-Magaña, Graeme Martin, Allan May, Stan Metzenberg, Juliane Mittman, Ronald Niece, Cristián Orrego, Marilyn Parsons, Sunil Paul, Silvia Peñaranda, Victor & Daniella Perloth, Nancy Pinzke, Ira & Edith Plotinsky, Stephen Popper, Julian Ponce, Ellen Prager, Jody Ranck, David Rider, Christine Rousseau, Claude & Elisa Rosseau, Daniel Sarewitz, Milton & Sondra Schlesinger, Sarah Shannon, Kirk Smith, Harvey Smith, Katharine Sturm-Ramirez, Jose Suaya, George Taylor, John & Sonya Thompson, Ed & Lori Wakil, Keith Wycoff. **Foundations and Corporations:** Acumen Fund; Amgen Foundation; Angelini Pharmaceuticals; Antibody Systems, Inc.; The Harold & Alma White Memorial Fund (Ayco Charitable Foundation); iGeneX, Inc.; Neurobiological Technologies, Inc.; Nobody's Children; NuGEN Technologies, Inc.; Pan American Health Organization; Polaner Family Supporting Foundation; Rockefeller Foundation; Schaffner Family Foundation; Sharon Ventures; V. Kann Rasmussen Foundation; W.K. Kellogg Foundation. **Material Aid Donors:** Don de Vaughn and BIOPLAS, Inc.; Hoefer Pharmacia Corp.; Ken Pine, Robert Watson and Roche Molecular Systems; University of California, Berkeley; University of California, San Francisco; and others.

## SSI Volunteer of the Year:

### Robert Beatty, Writing Instructor Extraordinaire

He has taught for SSI in three countries and is busy preparing to go to the fourth. He's so entertaining that his students have said his lectures don't need to be translated. He has improved on the curriculum for every course, organizing the most successful SSI science writing workshop to date in Guatemala almost single-handedly.

He's Robert Beatty, SSI's most recently elected board member and spearhead of SSI's new science writing program.

An Assistant Adjunct Professor of Immunology at UC Berkeley, Robert met Eva Harris while the two were graduate students there many years ago. In 1999, he began collaborating with one of SSI's long-term mentees, Betzabé Rodriguez, on a project investigating the cellular immunology of leishmaniasis, when she was a visiting scientist at Berkeley; in 2000, he went



Robert (center) with students in Panama

to Nicaragua to further assist Betzabé with the project on-site. Then, in the summer of 2003, SSI enlisted Robert as the *Leishmania* expert for the manuscript-writing workshop in Panama.

Robert, a natural teacher, was hooked.

"I love teaching, seeing people understand things for the first time, being able to transmit my enthusiasm about science to them," he said. "And with SSI's mission of helping people in other countries do science — that's what I like to do. Promoting scientific exchange to help people in countries with high disease burdens is the best of SSI."

After Panama, he took on increasing responsibilities, helping to coordinate the June 2004 collaborative writing workshop with PAHO in Paraguay. In August, he stepped in to put together the workshop in Guatemala, interviewing new instructors, planning the lectures, and communicating with the local partners. This January, SSI will send Robert to Cairo to provide immunology training for our Egypt program.

"Robert is a great teacher," said Scientific Director Maria Elena Peñaranda. "His lectures are very interactive, clear, and dy-

namic — able to transcend the language barrier. He's good for SSI because he's so motivated. He agreed to take this on as a volunteer, which is a lot of work, because he believes in our goals and mission."

According to Robert, "The trainings work to bring science in the US and other countries to a more personal level. We're dealing with the same issues they're dealing with. We all experience the trials of preparing a coherent manuscript that will have an impact."

With Robert's invaluable help, an impact is exactly what SSI is working to achieve.

***"Promoting scientific exchange to help people in countries with high disease burdens is the best of SSI."***

## SSI Volunteers: Committed to Science at Home and Abroad

Year in and year out, SSI counts on help from our extensive network of scientific volunteers in order to be able to support researchers in developing countries to study the diseases that affect their communities. Two aspects of our work in particular — the Material Aid and Small Grants programs — simply wouldn't function without the immeasurable help we receive from volunteers.

### Material Aid

Since SSI's inception, we have made it part of our mission to ensure that our trainees have the supplies and equipment they need to carry on the research begun in the workshops. In 2003, SSI's Material Aid program received an enormous boost. The International Science and Health Network at Harvard Medical School, a group of PhD and medical students, initiated an effort to collect, clean and ship massive amounts of unused and discarded supplies and equipment from local labs to SSI's partners in developing countries. In two shipments — made directly by the volunteers from Boston with funds for the transport provided by SSI — the group provided \$50,000 worth of equipment in 2003 and

\$80,000 in 2004 to SSI trainees in Argentina, Brazil, Ecuador, El Salvador, Guatemala, Paraguay, Panama, and Venezuela. More than 20 students are now involved.

Justin Yarrow, who had volunteered with SSI previously, spearheaded the effort. "Having a centrifuge or a PCR machine in a lab in a developing country makes a big difference in the types of experiments that can be performed, and there were just too many labs at the medical school where equipment was sitting on the shelves and going to waste," he said.

Most impressive is the impact for SSI's partners in Latin America.

At the *Universidad San Carlos* in Guatemala, where SSI has been working since 2001, Ana Maria Xet-Mull and colleagues have used the thermocyclers, water baths, vortexes, and computers that read gel electrophoresis results to establish a complete molecular biology unit for tuberculosis research where there was none before. In Ecuador, SSI Program Director Josefina Coloma used Harvard-generated supplies and equipment to initiate a molecular biology unit at the national reference laboratory (*Instituto Nacional de Hi-*

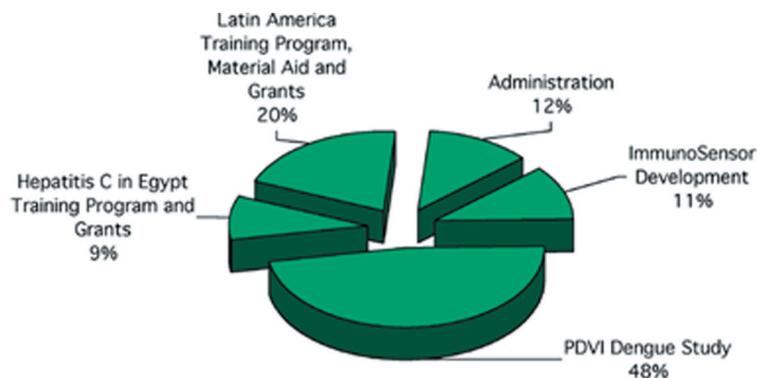
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*Eager participants in the PDVI Dengue Study in Nicaragua*

## 2004-05 Operational Budget

Total Budget: \$1,060,000



**Your donation sustains the work of SSI.**  
[www.ssilink.org](http://www.ssilink.org)

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**Sustainable Sciences Institute is a 501(c)(3) non-profit organization that develops scientific capacity to address public health needs worldwide.**

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