Research and clinical operations of the UCSF Newborn Brain Research Institute (NBRI) and Neurointensive Care Nursery (NICNI) were featured this year in the journal *Nature*. 
Dear Faculty, Fellows, Co-workers, Alumni and other Friends,

In the annual letter, I will cover developments and achievements during the past academic year and our prospects and plans for progress in the coming year. One of the notable events was the promotion of former Chief of the Division, Samuel Hawgood, to Dean of UCSF School of Medicine. The photo above is from the 2010 Tooley dinner in honor of Dr. Steve Abman, Professor of Pediatrics, University of Colorado, Denver (pictured front row center between (left) Dr. Roberta Keller and (right) Dr. Roberta Ballard. For Alumni, we are now pleased to extend “Dinning Rights” and an open invitation to all former trainees and faculty of the Program to join us for the Tooley dinner as the Division’s guest. Its one way we can try to stay in touch. We will send an announcement prior to the event with contact information.
I. Impact of Economic Stress, Budget and new ‘Developments’

As we are all aware, the University of California is suffering under the economic strain and this affects the UCSF Department of Pediatrics and the Division. All divisions were asked to make cuts in their annual operating budget. The Division of Neonatology was set a target by the Department of Pediatrics for cuts, which I think will be manageable because of enhanced extramural support for some faculty. I think we are in a sound position looking forward into the 2010-11 academic year. In fact, based on a new arrangement with the Department of Pediatrics, the Division will have the ability to directly control funds based on an incentive formula that depends on making sufficient clinical revenue and/or cost reductions.

Although the Division has not focused much attention to development and fundraising in the past, this avenue will become increasingly important for programmatic expansion and support of faculty research. I am pleased to announce that the new Director of Development in Pediatrics, Maureen Royer, is working to raise such funds for the Division.

Please consult the “How to Help” section of the Division website for more information about supporting the Division: http://neonatology.ucsf.edu/about/how-to-help.aspx.

Or, you can contact Maureen Royer directly:
phone: 415.476.3628
email: mroyer@support.ucsf.edu.
II. Faculty News

New Faculty

Elizabeth Rogers, MD, completed her undergraduate education at Harvard University and received her medical degree from Stanford University. After finishing her Pediatric Residency at UCSF, she remained to complete her fellowship training in Neonatology here at UCSF. She has been the recipient of numerous teaching awards and honors throughout her training, including the UCSF Abraham Rudolph Award and the Postdoctoral Fellow Teaching Award. During her fellowship, Liz continued the research she began during residency, studying neurodevelopmental outcomes of premature and critically ill neonates born to mothers with preeclampsia and infants conceived through assisted reproductive technologies. She will continue this work as a faculty member within the Division of Neonatology and has taken a position as Co-Director of the High Risk Infant Follow-Up program.

Ann Zovein, MD, completed her undergraduate education and received her medical degree from Boston University. She then migrated to California and completed both her Pediatric Residency and Neonatal Fellowship training at UCLA, where she also received a Pediatric Scientist Development Program award during her Fellowship. Subsequently, she was awarded a post-doctoral fellowship at the UCLA Institute for Stem Cell Biology and Medicine and pursued research investigating the endothelial origins of hematopoietic stem cells. Her past research has resulted in several grants and important publications. She received a prestigious Burroughs-Wellcome Career Award for Medical Scientists. Dr. Zovein was selected after a nationwide open search for a laboratory position at the Cardiovascular Research Institute (CVRI) with a joint appointment in Neonatology.

Transitions

Faculty member Dr. Mike Kuzniewicz was successful in obtaining K23 funding for his research in epidemiology, and he has taken a position in the Division of Research at Kaiser Permanente, Oakland, CA. Mike will continue to attend at the Moffitt-Long ICN and will be involved in collaborative research with the Division of Neonatology. We congratulate Mike on his accomplishments and wish him well in his future position.

Dr. Rod Phibbs officially retired from UCSF in December 2009 after 45 years of distinguished contributions as a faculty member and former Chief of the Division. The faculty presented Rod with a sailing chronometer watch at the 2010 Tooley dinner as a small token of our esteem. Rod’s unique perspective, participation in conferences, on committees and outreach will be greatly missed.
III. Training Program News

Graduating Fellows

Dr. Nami Jhaveri. Dr. Jhaveri graduated from the Fellowship program and will be leaving to take a position at Kaiser Permanente Oakland. We look forward to ongoing contact with Dr. Jhaveri.

Dr. Elizabeth Rogers. Dr. Rogers graduated from the Fellowship and will be based at Moffitt-Long Hospital. She joins Bob Piecuch as Associate Director of the ICN follow-up clinic (see “New Faculty”, above).

New Fellows

We are happy to welcome two new fellows to the program:

Lisa Bain, MD is a native of the East Bay who completed her undergraduate education at Stanford University with Honors. She then finished her medical education at UCSF and has maintained a long-standing interest in Health Care Quality Research. Prior to starting medical school, she worked at the National Quality Forum in Washington, DC on a project to establish a compendium of "safe practices" to reduce the likelihood of healthcare errors and reduce the risk of harm to patients. As a medical student, she worked with Dr. Robert Wachter on a study examining strategies for improving quality of care for diabetic patients, and she helped developed a 4 year curriculum to teach Quality of Care to medical students. She completed her pediatric residency training at Massachusetts General Hospital for Children in Boston in 2009, and spent the last year working as one of our ICN moonlighters and transport doctors. In addition, she began the Advanced Training In Clinical Research Program and has begun research with a new mentor, Dr. Adams Dudley (Dept of Medicine). She loves being back in California after 3 years in Boston and says she is a huge Stanford basketball and Giants baseball fan.

Andrea Wickremasinghe, MD was raised in the Midwest and completed her undergraduate and medical education at the University of Missouri in Columbia, MO. She completed two separate Summer Research Fellowships at the National Institutes of Health in 2003 and 2006, where she gained experience in both clinical and basic science research. She continued to pursue research experiences during her residency at The Mayo Clinic, Rochester, MN, where she worked with a number of clinical research mentors, including Dr. Bill Carey (UCSF Neo Fellow’04) in the Intensive Care Nursery. In residency she participated in a study evaluating the ability of various nursery screening assessments to accurately predict long-term developmental outcomes in premature infants which was published in the American Journal of Perinatology. For her research, Andrea is considering a project studying long-term neurodevelopmental outcomes in the MRI study cohort. Andrea enjoys distance running,
travel and cooking and recently ran in her first half-marathon. It will serve her well for the sprints between Moffitt and Long hospitals.

**Other Fellowship & Training News**

Our fellowship selection for two slots through the match in 2010 is ongoing. Our fellowship slots are highly competitive with a current acceptance rate of about 1/25 applicants. Notable events in the Fellowship and NIDCAP/APIB Training Programs this year include:

1. The Annual Fellows Retreat occurred in June and was an opportunity to enjoy some well-deserved time together outside the hospital-setting, as well as provide important feedback that was incorporated into the Annual Program review.

2. Our annual review of the program took place on June 17th with the Tooley Visiting Professor, **Dr. Steve Abman** and all members of the Internal Advisory Board. This was an exciting meeting in which the fellows presented their research and received useful comments.

3. The NICHD T32-funded Training Program is currently in its 30th year and we have resubmitted the competitive renewal of the training grant to continue our efforts. Our goal is also to try to expand Stem Cell Biology and Epidemiology and Bioinformatics into new areas of focus in the joint Neonatology-MFM program with leadership from **Drs. Susan Fisher** and **Gabriel Escobar** of the Kaiser-Permanente Division of Research, respectively.

4. **Dr. Gavin Henderson** was awarded support through the Pediatric Department’s Institutional T32Grant for 2010-2011. He will continue his research into the role of placental glycoprotein’s in the establishment of chorioamnionitis with his research mentor, **Dr. Susan Fisher** (OB/MFM).

5. **Dr. Mark Petersen** obtained a prestigious Pediatric Scientist Development Program award. Mark is the third fellow in the past five years to be funded by PSDP (others being Cindy Tran and Trevor Burt). Mark will be researching the role of fibrinogen in neonatal brain injury with his mentor, **Dr. Katerina Akassoglou, PhD**. (Gladstone Institute of Neurological Disease at UCSF).

6. **Dr. Kathleen VandenBerg** has successfully developed training at UCSF and she leads the West Coast Training Center for NIDCAP and APIB. The NIDCAP and APIB training center at UCSF is one of 16 worldwide centers in which training in evidence-based, individualized developmental and family centered care is provided. For further details consult our website.
The leadership has generated an inclusive plan for organization of major clinical and research efforts within the Division to provide pathways of career development, falling into two broad categories: 1) clinical services and 2) clinical-translational and basic science research.

**Clinical Service News**

**William H. Tooley ICN at Moffitt-Long Hospital**

A variety of factors have contributed to a lower ICN census in the 2009-2010 fiscal year compared to the previous year. Some of these factors include loss of access to the Brown and Toland insurance group patients, a generalized decrease in birth rate, and other centers opening programs to perform Hypothermia Therapy. Fortunately, this past year also saw an increase in the percentage of patients with commercial insurance (vs. MediCal) so that overall income to the Division of Neonatology was actually increased compared to the previous year. Although it has been difficult to fully understand the reasons behind this shift, a large part may be attributable to continuing efforts in Outreach as well as referrals to the Fetal Treatment Center and Pediatric Heart Center.

Because the census trend continues to be lower than previous years and the payment environment is uncertain, continuing efforts to provide the best possible Outreach and service to our referring institutions and physicians is crucial. Strategic plans to increase Division income include implementing billing for High Risk Infant Follow-up clinic, exploring strategic alliances with other medical institutions, and forging new Outreach affiliations.

**Quality Improvement:**

Thanks go to Mike Kuzniewicz, Laurie Nathan and Yao Sun who have led several QI projects in the ICN. These include (1) Reduction in blood stream infections, (2) Reduction in pressure ulcers, (3) PICC placement and dressing changes, (4) Major disaster planning and (5) IV placement satisfaction amongst parents.

**Family-centered care:**

Through meetings with Nursing School, Medical Center Nursing Administration and ICN staff, Yao Sun has begun planning for the PareNT Initiative (Parent Nursing Team Initiative) to teach parents how to provide care for their hospitalized infants. There are many reasons to consider this new model including potentially enhanced/consistent patient care, and parent and staff satisfaction.

**The Neurointensive Care Nursery**

The UCSF Neurointensive Care Nursery (NICN) reached a milestone with over100 referrals for therapeutic hypothermia since opening in July 2008. The aim of this service is to develop a co-
management model with neurology and a strong nursing component to optimize delivery of neuro-protective therapies as well as serve as a research platform for future clinical trials of new approaches that could optimize care for infants at risk for neurological injury. I would like to acknowledge efforts of Drs. Tom Shimotake, Sonia Bonifacio, Sally Sehring, Roberta Keller, Fernando Gonzalez, Bob Piecuch, Yao Sun and Hannah Glass who have taken major roles in implementing NICN protocols. Sue Peloquin has led the nursing effort and is building a superb team of NICN nurses, and Deb Dewar has represented the NNPs. The NICN has been featured in the local press (KGO-TV, San Francisco Chronicle, KQED) and was featured in the journal *Nature*. See our website for details: [http://neonatology.ucsf.edu/news/default.aspx](http://neonatology.ucsf.edu/news/default.aspx)

It seems to us likely that the NICN will change the standard of care for infants at risk for newborn neurological problems. In the coming year we look forward to implementing new and improved protocols for the following broad categories of patients: (1) Full term HIE/Stroke/Seizures, (2) Pre-term ELBW, (3) Congenital CNS malformations, (4) Post-op surgical/pain control. In each group, there are compelling reasons to think that enhanced neuro-monitoring, neuro-imaging and/or neurological input will improve management. In support of this, new papers published in the past year are showing how NICN care is improving standards.

**Examples of recent NICN Papers in press or submitted:**


   Brief summary: This paper described a novel multidisciplinary approach to care of NICU patients at risk for neurological injury, which is essentially the UCSF Neuro-intensive Care Nursery (NICN) philosophy.


   Brief summary: This paper shows that MR is a superior method for discerning underlying brain injuries in patients with neonatal seizures.

with hypothermia. Neurology, Submitted

Brief summary: This paper shows that EEG background is associated with imagin findings following hypothermia and that a high percentage of patients undergoing hypothermia for HIE have sub-clinical seizures, supporting the use of continuous EEG monitoring of such patients.


Brief summary: This paper indicates that MRI patterns of brain injury are changing in the post-hypothermia era. In particular, we are observing less DWI changes in the basal ganglia. It also identifies perinatal events (sentinel events vs decreased fetal movements) as important factors that may identify those who may benefit from hypothermia. Implications of this work are that we carefully re-establish how MR information in the acute period is reflected in long-term neurodevelopmental outcome.


Brief Summary: This paper shows that extreme premature birth is not a significant factor in brain white matter microstructure development and that clinical factors such as suffering significant brain injury, prolonged ventilation, presence of a patent ductus arteriosus and NEC, are stronger determinants of white matter maturation than gestational age alone. Implications of this work are that the care provided to these extremely premature infants may have a negative effect on development of the white matter.

Community & San Francisco General Hospital ICNs

We maintain strong relationships with the community through our ICNs at Santa Rosa Memorial Hospital, ValleyCare and Natividad. No new community ICN sites have been added during the past year; however, strategic planning for further development is ongoing and additional collaborations might evolve. Dr. Susan Sniderman has been recalled from retirement and continues to direct the SFGH nursery service.

The High Risk Follow-up Clinic (HRFC)

According to Dr. Liz Rogers, Associate Director of the HRFC, “This was another year of growth for the ICN Follow Up Program. We enrolled 202 patients this year, many more than our past average of 160 per year. This brings the total number of patients in our database to 5000. We are currently actively following 1000 patients. Our enrollment has been increasing since CCS established its new criteria for high-risk infant follow up (HRIF) in 2006, and with recruitment of patients...
through the NICN program. We enrolled 29 infants with HIE due to CCS guidelines and increased collaboration with the BAMRI study. We are seeing increases across the board, however, as evidenced by our enrollment of 35 infants born weighing less than 1000 g, which is also increased over previous years.

As a clinic, we are very interested in continuing to assess cognitive and neurologic development in our population but are increasingly interested by social-behavioral outcomes. Concerned by the degree of sensory impairment we are seeing in our population, we researched several different tools and have added the Sensory Profile to our standard assessment schedule, which we think will give families more information about ways their former preterm children can learn and succeed. Medical student, Lauren Wu, won a Medical School Research Grant to work with us and helped to complete a project in outcomes of preterm infants conceived by ART as well as a project looking at our positive MCHAT screens and incidence of sensory disturbances, which will be presented at the AAP meeting in October.

We continue to generate data and collaborate with several research studies and trials ongoing in the ICN, including PreMRI and BAMRI as well as the TOLSURF trial and are active in CDH clinic. We continue to see the majority of our patients in satellite clinics, of which there are now ten. This year, we took over the high risk infant follow up program at San Francisco General Hospital, where we both see patients and have the space to teach residents on their Behavior and Development rotation. We welcomed Gabe McMillan, well known to everyone from his days behind the ICN front desk, as our clinic administrator. He is well liked by our families and has been a great asset to the program.”

**Future of the Clinical Service at Mission Bay**

Our reputation for excellence will no doubt be further augmented by the move to the new UCSF Benioff Children’s Hospital located at Mission Bay. Plans for the new hospital are continuing including a vigorous development effort for new programs. We are grateful to the Benioff family for their inspirational gift. Building the new UCSF Children’s Hospital is a milestone in the Department of Pediatrics at UCSF, and Samuel Hawgood has been instrumental in promoting this significant development. To realize the full potential of the new hospital, it will be critically important to have an outstanding leader as Chair of the Department and a nationwide search to fill this position is ongoing.
Summary of Division Research

Research in the Division falls into three broad categories: (A) Clinical Investigation, (B) Basic/Lab-based Investigation and (C) Epidemiology, Informatics & Health Science Policy. The following sections outline current activities and plans to expand these programs.

Clinical Investigation

Given the extensive research activity in the ICN, we have expanded the process for initiating research studies in the ICN when broader input is needed, through creation of the Neonatal Clinical Research Committee, coordinated by Drs. Roberta Keller and Ron Clyman. We have seen an exceptional number of NEW clinical research grants that have been funded in the past two years including:

- **TOLSURF** (PI-R Ballard), which investigates late surfactant administration + NO in patients at risk for BPD.
- **PROP** (PIs-P Ballard/Keller), a biomarker study for BPD.
- **NEAT** (PI-Wu), testing safety of EPO + hypothermia in HIE/Stroke.
- Indomethacin/feeding study (PI-Clyman), testing tolerance of feeds during indomethacin therapy.
- **PDA ligation/hypotension study** (PI-Clyman),
- **ProPheno seizure study** (PI-Glass), evaluating anti-convulsant needs in patients with uncomplicated neonatal seizures.
- **Omega 3-FA and brain injury study** (PI-Tam), investigating regulation of nutrition in brain injury.
- **NEC biomarkers study** (PIs-Cooper/Sun), a biomarker study for NEC
- **PreMRI renewal** (PI-Barkovich), which uses MR imaging in pre-term infants for information on brain development.

Research Infrastructure:

The UCSF CTSA Pediatric Clinical Research Center (PCRC) nurses and PCRC medical director continue to work with investigators in developing their protocols to maximally utilize our research patient population. The PCRC currently supports more than 30 ongoing research studies and continues to provide educational and procedural support (e.g., critical care transport education) to the
Nicn staff. There will be new challenges in the future as we try to continue this level of investigator support at a time when an increasing amount of the PCRC costs will be shifted back onto the investigators. The Clinical Trials Core of the Fetal Treatment Center has been instrumental in supporting complex clinical trials, such as the MOMS trial (testing efficacy of pre- versus postnatal repair of myelomeningocele, PI-Farmer) and the new PMD clinical trial (PI-Rowitch), an industry sponsored trial that will test safety of neural stem cell transplant in patients with the rare congenital leukodystrophy, Pelizaeus-Merzbacher Disease.

Future Directions:

Dr. Roberta Keller has taken on additional roles as the Director of ICN clinical research, the division therefore is uniquely poised to provide superb training environment for clinician clinical trials investigators-in-training. Ongoing initiatives include: (1) Development of a Clinical Research section for the Neonatology website, which will include links to affiliated programs, resources and services. (2) An introductory clinical research pamphlet and encounter for families with a baby newly admitted to the ICN. We hope to that these educational resources will optimize participation in research protocols and avoid overwhelming families during a stressful period.

Basic/Lab-Based Investigation

Dr. Rowitch leads development of lab-based investigation in the Division. We plan development of integrated programs for translational research, which incorporate both basic science and clinical research components. This idea is demonstrated by the historical links of the CVRI to the ICN. The Newborn Brain Research Institute (NBRI) was also conceived as a translational research project linked to the NICN. New research in the NBRI is showing how key developmental regulatory pathways (Sonic hedgehog and Wnt) are involved in human newborn neurological injuries. Pre-clinical studies of Dr. Fernando Gonzales and Donna Ferriero have lead to a clinical study of EPO with hypothermia (PI-Yvonne Wu), providing an example of how the NBRI serves to promote new treatments. Efforts of the NBRI were featured in the journal Nature this year (see, “The Most Vulnerable Brains, http://neonatology.ucsf.edu/news/default.aspx).

We have brought on line a new support core facility, The Pediatric Research Neuropathology Laboratory<http://www.dmstat.com/SF/>, to help encourage new lines of patient-oriented investigation into human neurological disorders. For more information, please check: http://neonatology.ucsf.edu/research/default.aspx. In addition, to coordinated programs in clinical-translation research, we encourage many lines of investigation contributing a fundamental understanding of scientific questions relevant to human developmental biology and disease pathobiology. The NBRI and NICN retreat will take place on November 2nd 2010, at which time new research needs, goals and prerogatives will be established for the coming few years.

Our progress will be measured by traditional metrics such as papers published by the Division, extramural-funding obtained, honors and awards, and most importantly, new opportunities for fully
independent lab-based investigators. In the latter respect, the Division has partnered with the CVRI in the recruitment of Dr. Ann Zovein. The NBRI currently has a job opening for a physician-scientist; for more information, please check: [http://neonatology.ucsf.edu/nbri/NBRI-physician-job-opening.aspx](http://neonatology.ucsf.edu/nbri/NBRI-physician-job-opening.aspx)

**Epidemiology, Informatics & Health Science Policy**

The Division has plans to expand opportunities for research training in Epidemiology, Informatics & Health Science Policy (EIHS) in the coming years. The EIHS track was proposed as an addition to the Division NICHD T32-funded training program, with oversight of the track by Drs. Tom Newman (UCSF) and Gabriel Escobar (Kaiser Permanente Division of Research), who have functioned as effective mentors to several UCSF fellows in neonatology and MFM. We also look forward to providing training in bioinformatics in coordination with the greater UCSF community.

**Division Productivity 2009-present**

In the past 18 months the fellows have published 11 papers and reviews and the faculty has published 109 papers and reviews. See the Appendix below for further details. These numbers indicated that the Division continues to be a leader in academic productivity amongst our peer institutions in Neonatology in the country.

See photo for another measure of ‘productivity’. Since 2009, we have had eight family additions amongst fellows and faculty! Pictured (l-to-r), Nami Jhaveri (with Roshan), Liz Rogers (with Eleanor Ruth), Cindy Tran, Sonia Bonifacio, Janet Shimotake (with Allison Hana). Other fellows with babies born this year not pictured were Gavin Henderson (twins Andrew and Sarah), Lisa Bain (Oliver) and Mark Petersen (Nora), and Sharon Chen, one of our moonlighters (Kailani). We note that for mysterious reasons, children of UCSF neonatology fellows are often born on post-call days.
William H. Tooley 2010 Lecturer – Dr. Steve Abman

This past June we were visited by 2010 Tooley Distinguished Lecturer, Dr. Steven Abman, Professor of Pediatrics at University of Colorado, Denver, CO. Dr. Abman is a highly accomplished clinical-translational research who, together with collaborator John Kinsella, has made major contributions to our understanding of the fundamental biology and clinical application of NO in the treatment of BPD. His other interests include regulation of pulmonary angiogenesis. Dr. Abman gave several very provocative and interesting lectures and provided effective feedback to fellows at the annual NICHD T32-funded Training Program in Perinatal Biology external review.

Dr. Joseph J. Volpe, Bronson Crothers Distinguished Professor of Neurology, at Harvard Medical School will be the 2011 Donald G. Berg Distinguished Lecturer and 14th William H. Tooley Visiting Professor. Dr. Volpe, considered the father of neonatal neurology, is an internationally recognized clinician and investigator of newborn neurological injury.

For Alumni, we are now pleased to extend “Dinning Rights” and an open invitation to all former trainees and faculty of the Program to join us for the Tooley dinner as the Division’s guest. Please let us know if you would like to attend the 2011 Tooley Lecture and Dinner in mid-March. We will send an announcement with further details and contact information in due course.

Staff Appreciation

The support of our outstanding staff is essential to smooth operations of the Division and we are very thankful to Zoe Ann Hinson-Pardini, Division Administrator (not pictured), Mary, Cheryl and Sharlene for their hard work and dedication.

Mary Ulman, RN, Assistant to Dr. Rowitch, with Rob Phibbs

Cheryl Fong, Assistant to Dr. Sun, with partner, Bob Alonso.

Sharlene Thompson, MS, Fellowship Coordinator, with finance, Rich Johnson.
Closing thoughts

While a somewhat challenging year given the financial pressure faced by the Division, we are making good progress. Extramural grant support has increased substantially this year, and (as mentioned above) we have begun a fund raising campaign to further enable program development in this climate. We have made progress in terms of clinical revenue, quality improvement and new models of clinical practice (e.g., the NICN), which may further distinguish the Division as a place of clinical innovation. Clinical research and basic research are both showing in strong growth mode, and I believe we are providing opportunities for our fellows and junior faculty to develop strong research portfolios. On the whole, it’s a very encouraging picture. For current fellows and faculty, I’d like to say thanks to all of you for your superb work in the ICN and in your research, and to our alumni, thanks for your ongoing interest in the Division.

Humbly submitted,

David H. Rowitch, MD, PhD, Professor of Pediatrics & Neurological Surgery, Chief of Neonatology, Howard Hughes Medical Institute Investigator, UCSF
Appendix:

List of all peer-reviewed research papers and reviews published or in press over the past 18 months (2009-present)

FELLOWS

Dzietko, Mark


Jhaveri, Nami


Rogers, Elizabeth


**Sanders, Tim**


**FACULTY**

**Ballard, Phil**


27.


Ballard, Roberta


Bonifacio, Sonia


Burt, Trevor

1. Burt TD, Mold JM, Kappas A, McCune JM. Activation, proliferation and maturation of human T lymphocytes is induced in vitro by the Heme Oxygenase-1 (HO-1) inhibitor Tin Mesoporphyrin (SnMP), and requires interaction with CD14+ monocytes. Manuscript in preparation.
Francoise and Ron Clyman at 2010 Tooley Dinner.

Clyman, Ron


Book chapters:


Gonzalez, Fernando


Book Chapter:

Hawgood, Sam


Keller, Roberta


Chapters


Kitterman, Joseph


Kuzniewicz, Michael


Lee, Henry


Books Chapters


**Maltepe, Emin**


**Martinez, Alma**


McCulley, David


Partridge, Colin


Petryniak, Magda


Piecuch, Robert


Rowitch, David


Schrinng, Sally


Book Chapters:


Taeusch, William


Vandenberg, Kathy
Books


Zovein, Ann


2. Zovein AC, Iruela-Arispe ML. Time to cut the cord: placental HSCs grow up.