EA Chronicles
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Peter Lampert and the Inquiry into Brain Trauma in Boxing and Football

By Henry Powell
Professor Emeritus of Pathology

One of the pleasures of attending the annual meeting of my professional specialty is the chance to get together with former trainees. Several years ago, when I went to the neuropathology meetings, **Ron Hamilton**, who trained here, told me he was going to be a character in a movie and wondered who would get to play him. The movie, called "Concussion," was screened in 2015. It came about because Hamilton, a professor at the University of Pittsburgh, had been instrumental, in collaboration with a mentee, in calling attention to the brain injuries sustained by **Mike Webster,** a center for the NFL's Pittsburgh Steelers. Known as "Iron Mike," Webster's outstanding playing career had earned him induction into the Football Hall of Fame; but his life ended at the age of 50 under grim and miserable circumstances. He was one of seven former players known to have committed suicide as an indirect result of brain trauma. (Another was the Chargers' **Junior Seau**).

What I learned took me back to the earliest years of my training, and concerns the study of brain trauma as a public health measure. The gist of the story is that medical specialists have known for some time that two very popular sports, boxing and football, link the human desire for entertainment to severe injury and lifelong trauma – something that the athletes themselves, their professional associations, and the general public have been very reluctant to acknowledge.

Professor Emeritus Henry Powell

Peter Lampert's Pioneering Role

I first heard about the neuropathology of brain trauma from the late **Peter Lampert** (1929-1986), the first neuropathologist to be recruited to UCSD and the head of both neuropathology and the Department of Pathology here. For those fortunate enough to be trained by him, he was a great mentor. Although his research interests focused on viral brain infection as well as on the pathology of multiple sclerosis, Lampert was keenly interested in how the brain reacted to every kind of injury. A brilliant experimental pathologist, he sought to demonstrate with electron microscopic images the impact on individual cells of different kinds of injury. Trauma was especially concerning because there is no path to recovery for injured tissues. The pathologist's job was therefore to identify the structural injuries in damaged brains and educate our colleagues and the broader public about the risks.

Lampert had worked at the Armed Forces Institute for Pathology along with a colleague, **John Hardman**, during a time when boxing was always in the news and when the medical profession believed that its risks should be publicized. Public concern about boxing was especially keen in the UK, where anti-boxing advocates such as the extraordinary Baroness **Edith Summerskill** (both an MD →

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and an MP!) called on her fellow lawmakers to regulate this highly popular sport. Its only purpose, they pointed out, was to inflict sufficient injury so as to incapacitate an opponent. Boxing had been known as "the Noble Sport." She wrote a book in 1956 called *The Ignoble Sport* in which she pointed out that the focus of that injury was the brain itself. In 1984 the Council of the American Medical Association published a report on brain damage to boxers and the Journal of the AMA invited Lampert and Hardman to comment on it. While their comments described both hemorrhagic injuries and damage to nerve cells associated with "*dementia pugilistica*," they took pains to emphasize mechanisms of injury, in particular the effects of repetitive subconcussive blows as opposed to knockouts.

Dementia pugilistica had first come to public notice in 1928 when **Harrison Martland**, a pioneering forensic pathologist, opened up the field of chronic traumatic encephalopathy in an article in the Journal of the American Medical Association (JAMA). He also coined the term "punch drunk." Fortunately, Martland was a medical examiner who had been well tested by the culture of cross examination because he was subjected to a torrent of abuse by outraged boxing advocates. Martland forecast that neuropathologists connected to psychiatric hospitals would eventually document brain injury, as opportunities arose to examine the brains of punch drunk fighters.

A British neuropathologist ,

J.A.N. Corsellis, did just that and in 1973 published an account of the "aftermath of boxing," in which the brains of fifteen retired boxers whose days ended at the Runwell Hospital in Southeast England were dissected postmortem. He described how the *septum pellucidum*, a neural tissue membrane that divides the two brain hemispheres, is split apart and the fluid filled spaces called ventricles become larger due to tissue loss from the surrounding brain. Along with this macroscopic injury, hemorrhages are common, the large ones being sometimes lethal. More insidiously microscopic hemorrhages damage local areas throughout the traumatized tissue. Nerve cells undergo acute and chronic injuries, some of which reminded microscopists of the "tangles and plaques" microscopically visible in the brains of patients afflicted with Alzheimer's neurodegeneration. But an important difference between boxers' and Alzheimer's patients' brains is the localization of the injuries. Alzheimer's strikes centers of memory, whereas the boxers' injuries affect different areas of the brain, including the cerebellum, an organ closely identified with balance and coordination.

The Key Findings

Hamilton's colleague at Pittsburgh, the forensic pathologist **Bennet Omalu**, realized that Mike Webster's brain provided an opportunity to better understand the impact of chronic trauma on an athlete's brain after years of hard play and well documented instances of neurologic impairment. After he worked up the case material very carefully, Omalu took the slides to Hamilton and asked him to review them without any clinical or personal information about Webster. It is the custom in such consultations for each pathologist to review the microscopic slides without any other information and then offer an opinion. Hamilton asked if the patient was a boxer. Omalu's wide smile confirmed that this was indeed an instance of chronic traumatic brain injury. They consulted **Steve DeKosky,** a nationally renowned Alzheimer's expert, and after a further year's work the case report was published. Throughout this process all of them expected that the National Football League would welcome the information, but just as Martland had experienced in the case of boxing, critical information about a nationally beloved sport would generate fierce controversy.

To protect themselves boxers wear padded gloves and football players wear shock-absorbing helmets. Gloves protect a boxer's hands, but the cruel irony is that they thereby allow the fist to deliver a more powerful blow, a blow that can devastate the brain. As Lampert and Hardman noted, that blow can have the force of a hundred times that of gravity, or half a ton. Helmets protect the football player's skull, but what is not well appreciated is how violently the brain inside that skull is bounced around and injured by being slammed against its bony container. What is not widely understood is that the brain is a gel-like organ, softer than the tissues of a snail or a slug. When it is taken out of the skull, it is so soft that it cannot maintain its own shape, the shape that is maintained *in vivo* by intracranial cerebrospinal fluid that bathes the entire central nervous system.

The vulnerability of brain tissue is readily understood if you are a surgeon or a pathologist, but not so easily by athletic coaches or by sports organizations whose very practices subject organs and tissues to forces that lacerate the delicate nerve cells and their long, thread-like extensions called axons. The axons and their connections constitute the "wiring" of the central nervous system. But "wiring," a much used analogy, is a misleading term

because it suggests metallic toughness, durability and reparability. Indeed "wiring" is almost a mischievous analogue since it suggests a durable strength that these structures do not have. The brain is *not* a machine made of metal. If you step on your cell phone it may survive. But if you step on a slug or a snail, the creature is smashed beyond repair. The analogy holds for mammalian brain tissue too. And the brain is even more physically vulnerable and only partially protected by the bony case in which it is packaged. The skull itself can damage the brain when rapid subconcussive blows move the cerebral and cerebellar hemispheres violently within the confines of the skull, lacerating axons, injuring blood vessels and shattering the delicate cellular fibers that make and maintain connections between brain regions and the peripheral nervous system, the system that innervates the rest of the body.

When Lampert and Hardman wrote about boxing they emphasized the vulnerability of the moveable head and the impact of blows that cause the soft brain to glide and swirl within the skull, tearing blood vessels and the axons that are the very lines of communication within a cognitive organ. They emphasized that it was not just knockout blows but rather the summation of minor damage over successive bouts that contributes to long-term injury and the cognitive and motor changes that result in slurring of speech and chronic impairment of balance. The lessons learned from their work passed on to new generations of neuropathologists, including Hamilton. When he shared his view of the injuries that had devastated Webster's brain with Omalu, they both knew that they had some very important information to share with both the profession and the broader public.

They also had some new tools that were not available to Lampert and Hardman. Paying for the materials out of his own pocket, Omalu stained slices of Webster's brain with an antibody to tau, a major structural protein found in nerve cells and glia, the supporting cells surrounding neurons. But in injured brains tau accumulates in a phosphorylated form, phosphorylation being nature's way of tagging a defective protein for removal. While that damaged protein piles up inside the organ, key brain functions including cognition are impaired and whether this happens in the brain of a patient with Alzheimer's disease, or a punch drunk boxer, or a football player, its effects are very harmful.

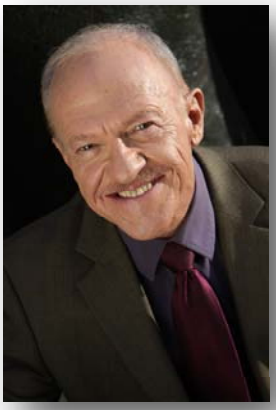
The story of the medical research is told in *League of Denial: the NFL, Concussions, and the Battle for Truth*, a fine book by **Mark Fainaru-Wada** and **Steve Fainaru** published in 2013. The movie "Concussion" and a PBS Frontline documentary are based on the book. The message of the research was at first resisted by the National Football League brass, much as tobacco company executives denied the health dangers of smoking. But players began to listen and more and more wrenchingly sad accounts of impaired players have been recounted. Many are willing their brains to 'brain banks' where skilled neuroscientists can determine if they show signs of Chronic Traumatic Encephalopathy. Players have become so attuned to the need for postmortem neuropathologic evaluation in accredited centers that in at least one instance a player about to take his own life shot himself in the heart so as to ensure that the brain is not damaged by a bullet. In 2015 the courts approved a settlement reached by the NFL with the players association that will pay as much as $5 million per retired player to compensate claims for injuries due to repeated head trauma. The League has also issued instructions to teams to take players out of a game if they experience a concussion.

If the story has an underlying moral, it is the enduring value of the autopsy. I liken this investigation to the last chapter in every patient's medical biography. I think that it should not be left unwritten, especially if the patient themselves request that after their death, their brain be studied. Such investigations help to explain to others the neurological and psychological consequences of repetitive brain injury sustained when blows, falls, and bodily collisions subject the brain to repeated violent acceleration and deceleration as the soft friable human brain smashes up against the skull that contains it and is there to protect it, but cannot do so against every contingency.

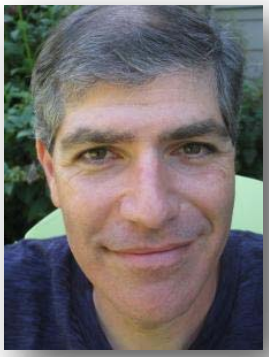
As a coda to this tale, I am happy to note that Dr. **Ann McKee**, one of the leading students of brain trauma among professional athletes, has agreed to deliver the thirtieth annual Peter W. Lampert Memorial Lecture at UCSD in 2017. She will report on the present status of research into chronic traumatic encephalopathy. We look forward to hearing of the progress in the field of investigation to which our late distinguished UCSD colleague contributed so importantly by his research and teaching. This is surely one of those landmark efforts that make ours such a pioneer among research universities.

Immigrant-Bashing on Both Sides of the Atlantic:
Insecure Workers and Scapegoat Politics

By Wayne A. Cornelius
Theodore Gildred Distinguished Professor of Political Science Emeritus
and Daniel Tichenor
Philip H. Knight Professor of Political Science, University of Oregon



LEFT: Distinguished Professor Emeritus Wayne A. Cornelius



RIGHT: Professor Daniel Tichenor

Immigration – its levels, source countries, perceived negative consequences, and cynicism about government efforts to control it -- is at the heart of this year's U.S. presidential campaign, motivating many of the 13.3 million voters who backed Donald Trump in GOP primaries. Videos of Trump rallies posted by *New York Times* reporters show his supporters chanting "Build a wall! Kill them all!" And according to both supporters and opponents of Britain's exit from the European Union, immigration was also at the core of the "Leave" vote. Even Britons living in places that have benefited handsomely from EU subsidies and investments could not bring themselves to support staying in the union, because of concern over immigration.
Why are anti-immigrant appeals resonating so powerfully in pivotal elections on both sides of the Atlantic? In the U.S., why are calls for building a wall on the border with Mexico and deporting millions of undocumented immigrants already here so attractive to so many voters, even as the actual flow of undocumented immigrants from Mexico has dropped to the lowest level since 1971?

American history is replete with episodes of nativist agitation, dating back to the 19th century. Such movements have emerged at times when working-class people have felt most economically insecure and new immigrants could serve as convenient scapegoats. Amid drastic wage decline and record unemployment in 1870s California, a modest influx of Chinese immigrants, recruited as cheap contract labor, became the focus of white worker outrage. The root causes of their distress actually lay in unproductive mines, the completion of the transcontinental railroad, and a flood of new European immigrants to the Pacific Coast.

Indeed, Chinese immigration was miniscule compared with inflows from Europe (just 4 percent of all immigration at its zenith). Nevertheless, California politicians, led by Dennis Kearney of the Workingmen's Party, quickly learned that anti-Chinese speeches and policies translated into votes. Large bipartisan majorities in Congress soon passed the infamous Chinese Exclusion Act of 1882, suspending all Chinese admissions for ten years. Similar dynamics played out during the Great Depression, with nativist lawmakers blaming 16.5 million foreign-born for the nation's economic suffering, a rationale used to deny asylum for European Jews during World War II.

Recent anti-immigrant movements have also been whipped up by entrepreneurial politicians using xenophobia to tap into an underlying current of economic insecurity. A prime example is the early 1990s Proposition 187 movement in California, which Pete Wilson latched onto and rode to reelection as Governor. Wilson cast immigrants as "takers" rather than contributors to the state's economy, whose growing numbers had caused a fiscal crisis. His Democratic opponent, Kathleen Brown, never convincingly rebutted Wilson's claims, which were not grounded in evidence.

This year's success of angry populist movements on both sides of the Atlantic can also be read as a tale of effective political entrepreneurship. There is convincing evidence that a backlash against immigration has been building in the American electorate since the 1980s, especially among white males, driving large-scale registration changes from the Democratic to the Republican Party. The backlash has been driven, in part, by overwhelmingly negative framing of immigration in the mass media. UCSD political scientists Marisa Abrajano and Zoltan Hajnal found that there are four times as many negative stories on immigration as there are positive ones, even in

mainstream, liberal media like *The New York Times.* Nevertheless, it is unlikely that immigration would be center-stage in the 2016 U.S. presidential election if Donald Trump had not made it his signature issue, from the first day of his campaign. His fiery calls for wall-building and mass deportations have captivated many economically and culturally insecure white voters, especially those with less than a college education.

Similarly, in Britain, leaders of the "Leave" campaign, like Nigel Farage and Boris Johnson (now Britain's Foreign Secretary) seized on immigration as the core concern of people favoring departure from the European Union. As former Prime Minister Tony Blair observed after the Brexit vote, the hard right in British politics "took this issue and focused its campaign to leave Europe on it." As in Pete Wilson's California, U.K. immigrants were painted as scroungers coming to take Britons' jobs and benefits. And as in 1990s California, Britain's center-right and Labour politicians failed to deliver an effective response to the strident, anti-immigrant scapegoating and fear-mongering of the "Leave" politicians.

Nativist political entrepreneurs take advantage of low levels of information and lack of direct experience with immigrants among the voters whom they target. Survey data show that Americans who are least tolerant of immigration are those who have little or no personal contact with immigrants, in their workplaces, churches, schools, and neighborhoods. This finding is consistent with Brexit results showing that voters living in high-immigration areas like London voted to remain in the EU.

Measuring the economic impacts of immigration on a receiving country's population is technically complex. But the vast bulk of systematic research, in both the U.S. and U.K., shows that the labor market consequences are far less than popularly believed. At least in the short term, international labor mobility, like other dimensions of globalization, produces winners and losers. It can negatively impact the wages of the lowest income-earners while raising the incomes of higher earners. But in both cases the effects are very small.

Moreover, it is not at all clear that native-born workers would be helped appreciably by adopting more restrictive immigration policies. We know from extensive research that direct immigrant-to-native competition for the same jobs, in the same industries, in the same regions, is rare due to segmentation of the labor market over several generations. Very few native-born workers apply for jobs in immigrant-dominated firms. We also know that wage stagnation is driven far more by the decline of unionization, outsourcing, and technological change than by immigration.

Some people who support anti-immigrant candidates and movements undoubtedly view themselves as victims of "uncontrolled" immigration. But only a minority of such voters are low-skilled workers who personally experienced unemployment or depressed wages due to immigration. Many more seem to be responding to nativist appeals by entrepreneurial politicians, whose messages are amplified by both the mass media and social media. Their rhetoric demonizes immigrants by depicting all of them as burdens on the economy as well as threats to national security and cultural cohesion, while ignoring the benefits of their presence to consumers, employers, and national economic performance.

The kind of immigration debates now raging on both sides of the Atlantic deflect attention from policies that might actually improve the lives of those who see themselves as victims of immigration. For example, Britain lacks an effective national program to train native-born workers for construction jobs. Thus, Polish workers arrive better-trained for such jobs, and -- not surprisingly -- employers prefer to hire them. In the U.S., stagnant wages and income inequality could be addressed much more efficiently through investments in education, job training, child care, housing, and minimum wage enforcement than with an immigration crackdown. Both the United States and Britain have failed to provide enough targeted assistance to workers and communities negatively impacted by globalized production.

Can such policy nuances be communicated effectively in the heat of a national political campaign? The Brexit campaign suggests how difficult it is. "Leave" voters had multiple grievances against the EU, including excessive regulation from unelected bureaucrats in Brussels. "Remain" politicians did a poor job of addressing concerns about free movement of labor from other EU countries, in terms of its scale, pace of increase, and impacts on public services. The "Leave" campaign drowned them out with the simple message that immigration was "out of control" and causing profound problems.

Wayne A. Cornelius is the Theodore Gildred Distinguished Professor of Political Science and U.S.-Mexican Relations, *emeritus,* and founding director of the Mexican Migration Field Research and Training Program at UCSD. Daniel Tichenor is the Philip H. Knight Professor of Social Science and Fellow of the Wayne Morse Center for Law and Politics at the University of Oregon, Eugene.

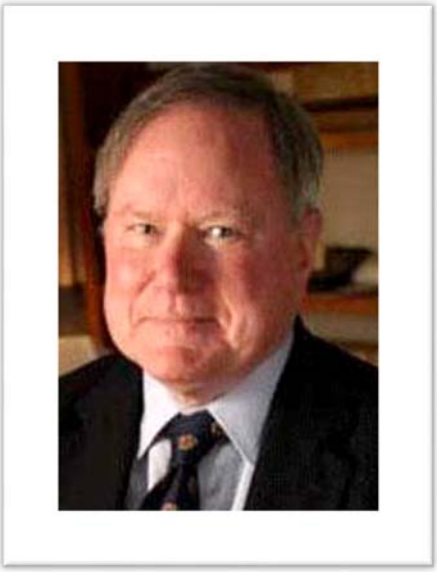
Dickson Professorships to Covell and Kennel

Two Edward A. Dickson Emeriti Professorships have been awarded this year, one to **Ruth Covell**, the other to **Charles Kennel.**

The awards come from a fund established through the estate of Mr. Dickson, who served on the Board of Regents of the University from 1913 to 1946, the longest tenure of any Regent. They endow appointments for the designated academic year at each of the ten campuses of the University, in accordance with the stipulation of the 1955 gift document:

> *For the support and maintenance of special annual professorships in the University of California to which shall be appointed by the President, with the approval of the Regents, persons of academic rank who have been retired after service in the University of California and who shall receive such awards in addition to their retirement or pension allowances. Awards shall be made upon such conditions of service, research or teaching as The Regents may require. Professorships so awarded shall be known as the Edward A. Dickson Emeriti Professorships.*

Professor Emerita
Ruth Covell



Professor Emeritus
Charles Kennel

Covell was cited for a wide range of activities since retirement. These include four years as a mentor in the Chancellors' Scholars program, service on an intensive junior faculty development program, clinical work in family medicine, and activity in a host of community organizations, including the San Ysidro Health Centers, Project Concern International, and the Epilepsy Foundation of San Diego. In 2012 she received the Distinguished Service Award of the University of Chicago Division of Medical and Biological Sciences, and in 2013 "Ruth Covell Day" was proclaimed by the City of San Diego in honor of her services to the community.

Kennel, since retiring as director of SIO, has remained in the forefront of studies of climate change and sustainability, along with colleagues here and elsewhere. He has written several major articles with UCSD colleagues on approaches to international collaboration to deal with the dangers from global warming. One of many of his projects has been the development of a highly successful "MOOC" (Massive Open Online Course") accessible on the internet on climate change. He also serves as Inaugural Visiting Fellow at the Centre for Science and Policy at the University of Cambridge, where he lectures and works each spring, and coordinates the collaborative Cambridge-UCSD Global Water Initiative. He has also chaired the National Academies Space Studies Board.

Dickson Award recipients

2016	Ruth Covell Charles Kennel
2015	**Jack C. Fisher** Wayne Cornelius
2014	**Richard Somerville**
2013	**Mel Green**
2012	**Marjorie Caserio** **Lea Rudee**
2011	**Jerry Schneider**
2009	**Peter Farrell** **Robert Hamburger**
2008	**Sandy Lakoff** **Kurt Benirschke**

Anecdotage

By **Sandy Lakoff**

When Science Meets Politics. After a stint in the White House, the economist **Carl Kaysen** recalled a conversation in the Oval Office. He had taken a group of weapons scientists there to persuade President **Kennedy** to agree to the proposed Limited Test Ban Treaty. The pact, later signed by the U.S. and U.S.S.R., banned testing in the atmosphere. It was intended to protect against radioactive fallout and as a step toward nuclear arms control. Kennedy asked if they could assure him that any possible Soviet effort to cheat could be detected. One of them said that any nuclear explosion would be detectible "within an order of magnitude." The President was unfamiliar with this mathematical reference, so he asked what it meant. The scientists explained that in simple terms it could be understood as a technical term for a value with a defined range. In this instance, it meant that any explosion having a yield with a TNT equivalent of at least one kiloton would be highly likely to be detected, but not necessarily one below that range. Kennedy was visibly shaken because he suddenly realized that some low-level cheating might go undetected. He thought about it and said finally, "In that case, I will trust you – within an order of magnitude."

* * *

A subtle joke, thanks to Janet Goff:
John: This is a terrible thesaurus.
Jane: What's the matter with it?
John: It's just terrible!

***

Having been born and raised in the peninsular city of Bayonne, New Jersey, which sits between Staten Island and the rest of what is now called the Big Apple, I came to share the general puzzlement over how the city got its name. Bayonne, France is a Basque coastal city in the southwest of that country, famous for its *jambon* and for inventing the bayonet. Our town had originally been populated not by Frenchmen but by the Dutch settlers of "New Netherlands." They named a neighboring city Hoboken and a nearby body of water the Kill van Kull, another Dutch name it retains. So how did the city come to have a French name? After World War I, a French army captain named **Henri de Bayonne** came to visit and claimed that his ancestors had given the town the family name. But he offered no proof and the claim was dismissed. About twenty years ago, I finally uncovered a plausible answer. I had been invited to Emden in northern Germany to present a paper at a conference. On the way back to Amsterdam, where I was to catch a flight home, I shared a train compartment with a Dutch colleague and told him of this puzzle. "I think I may have an answer for you," he said. It seems that a group of Basque fishermen had come with the colonists. They must have felt that our seaside location, on the Atlantic coast, reminded them of home. That still strikes me as the most likely explanation.

***

Terrible puns to be blamed on Harry Goldenberg, a groan man:

1. The fattest knight at King Arthur's round table was Sir Cumference. He acquired his size from too much pi.
2. I thought I saw an eye-doctor on an Alaskan island, but it turned out to be an optical Aleutian.
3. A water pistol was confiscated from algebra class, because it was a weapon of math disruption.
4. No matter how much you push the envelope, it'll still be stationery.
5. A dog gave birth to puppies near the road and was cited for littering.
6. A grenade thrown into a kitchen in France would result in Linoleum Blownapart.
7. Two silk worms had a race. They ended up in a tie.
8. A hole has been found in the nudist camp wall. The police are looking into it.
9. Time flies like an arrow. Fruit flies like a banana.
10. Atheism is a non-prophet organization.
11. Two hats were hanging on a hat rack in the hallway. One hat said to the other: "You stay here; I'll go on a head."
12. I wondered why the baseball kept getting bigger. Then it hit me.
13. A sign on the lawn at a drug rehab center said: "Keep off the Grass."
14. The midget fortune-teller who escaped from prison was a small medium at large.
15. The soldier who survived mustard gas and pepper spray is now a seasoned veteran.
16. When cannibals ate a missionary, they got a taste of religion.
17. If you jumped off the bridge in Paris, you'd be in Seine.
18. Then there was the guy who sent ten puns to friends, with the hope that at least one of the puns would make them laugh. No pun in ten did.

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Chronicles

Newsletter of the UCSD Emeriti Association

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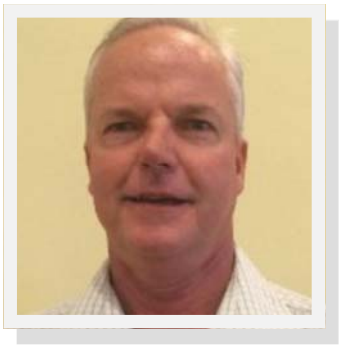
Mark your Calendar!

Robin Knight, Professor, Pediatrics
"How our Microbes Make us Who we Are"
Wednesday, October 19, 3:30 - 5:00 PM
Ida & Cecil Greene Faculty Club



Joel King, Campus Architect,
"Vision of the Future", **Wednesday, November 9, 3:30 - 5 PM**
Ida & Cecil Greene Faculty Club

Emeriti & Retirement Associations Festive Holiday Party ($10 per member)

Saturday, December 3, 1 - 4 PM
Ida & Cecil Greene Faculty Club