

LifeLines

For the California Life Science Community

10 Public Policy: Thinking Globally, Acting Locally (and in Sacramento and Washington)

12 An Eye for Solving a Global Epidemic: The Story of Freedom Meditech

15 When, Why, and How to Avoid Dilution in a Life Science Company



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Biocom Provides a
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WELCOME

By Joe Panetta,
President and CEO, Biocom

Greetings and welcome to each of our more than 900 Biocom members from the great state of California and around the globe! A special welcome to all of you joining us here in San Diego for the 2017 annual BIO International Convention. This is the fourth time that San Diego has hosted this premier event for the world of biotechnology, and I am honored to represent Biocom as a member of the Steering Committee. We have worked diligently over the last year to ensure that this will be the largest and most influential BIO Convention ever! As our stellar team of 50 employees works to build strong life science clusters throughout our state, and with partners in Europe, Asia and Australia, we look forward to showcasing the opportunity to become a Biocom member and to introducing newcomers to San Diego's incomparable life science ecosystem. We hope that you will stop by the California Pavilion on the exhibition floor and visit us in Booth 3727.

Last month, Biocom issued its 2017 Economic Impact Report, revealing that California continues to expand and diversify. Today, there are more than 12,000 life science establishments within the state, with a workforce of more than 325,000 employees who are paid an average annual salary of almost \$110,000! This all results in the industry generating an annual economic impact of \$317 billion. Interestingly, that is five times that of our world-renowned wine industry.

One of the most important messages that comes out of our Economic Impact Report, is that while the life science industry continues to grow regionally, we are increasingly compelled to act globally. I strongly believe that we must play a lead role in competing as well as collaborating on the world stage to continue to grow. That is why my team and I work diligently to ensure that our Biocom brand—and in turn, the California life science brand—is recognized within key life science regions, such as Japan, China and the European Union. I'd like our readers to understand how we are doing this and to inform you of the progress we are making abroad.

Several years ago, we welcomed Mayor Fumiko Hayash of Yokohama, Japan to San Diego. Yokohama is San Diego's sister city, and he joined us at one of our quarterly Biocom member breakfast meetings. The Mayor and I spoke about recent initiatives in entrepreneurship and Prime Minister Shinzo Abe's support of biotechnology. Following our discussions, Biocom joined a delegation to Yokohama to consider opportunities for life science collaboration. That first effort led to a partnership between Biocom and the Japan Bioindustry Association and also to our annual participation in the BioJapan convention, where we now have a California Pavilion. Next came our newest partners, including the City of Kobe and the Life Science Innovation Council of Japan in Tokyo. We now have more than 40 companies based in Japan within our Biocom membership—several of which now have offices in California. Last fall we opened our first international office, located in Tokyo, within the offices of our first Board member from Japan, Dr. Tsuneo Takahashi of NF Corporation. This year, Biocom welcomed more than 20 Japanese companies to our Global Partnering Conference in February and I hope to see many more here with us in 2018!

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WELCOME CONT.

Today, Biocom is exploring the possibilities with another Asian nation: China. Back in 2009, through our California Biotechnology Foundation in Sacramento, I led a group of state legislators to evaluate life science opportunities in the nation. At the time, we felt China was perhaps too new to the sector: with little experience or infrastructure, lack of protection for intellectual property, and a regulatory agency with focused mostly on generic drugs and herbal medicine. I returned to China this month with one of our member firms to find that much has changed. The country now regulates with a more robust set of legal protections for patents, has an established FDA that is modeling itself after that of the United States, and is home to a deep, sophisticated venture capital. I expect that we will form new partnerships there and that we will welcome Chinese companies here to California in the near future. In the meantime, I am participating in events that highlight China's presence here at BIO 2017, including moderating a panel discussing the impact of the Trump Administration at the meeting of San Diego's Chinese American Biopharmaceutical Association, better known as SABPA.

Now, I'd like to turn the compass west, to Biocom's presence within key life science centers in the European Union. First, we have a long-standing partnership in Cambridge, UK with One Nucleus. My first visit to the Cambridge cluster occurred not long after I joined Biocom in 1999. At that time, I was impressed with the pioneering work taking place there in gene sequencing. Many years later, I attended their annual biotech conference, leading to Biocom's regular participation in a networking breakfast panel at each BIO convention at the invitation of my good friend Harriet Fear, CEO of One Nucleus. This relationship has spawned many a biotech partnership between California and the UK. Elsewhere in the UK, Biocom has built a partnership with the EuroBioMed association located in Marseille, within the PACA region of southern France. One of the EU's largest and longest established life science parks is located within the region, as is some of the most advanced oncology clinical trials experience. This connection dovetails well with the San Diego ecosystem, where there are more than 150 oncology companies! In fact, one of our member companies recently opened an office in Marseilles, and one of EuroBioMed's member companies, Neuroservice, now has a San Diego office. Importantly, the company's CEO, Bruno Buisson, serves on Biocom's Board of Directors. Biocom and EuroBioMed will join together at the BIO convention through a networking event hosted by Business France, and we will begin planning for our November 2017 return trip to the PACA region with our members.

We have terrific partnering and networking taking place on the global front at Biocom. I believe that this will continue to be one of the most important focus areas for me as President and CEO of the largest, most experienced life science association in California. As we expand under Biocom's strategic theme of "Unite", the future of California's life science industry will be greatly determined by our ability to succeed globally. I hope to join with all of our members across the state and the world to meet this challenge in the years to come.

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COVER STORY

By Kelly Quigley, Canale Communications

For Life Science Companies in California, Biocom Provides A Window to the World

International trade and expansion is thriving in California's biotech markets.

In 2015, Brad Messmer, Ph.D., packed his suitcase, grabbed his passport, and set off for Southeastern France.

He wasn't going for a suntan; he could get that right at home in San Diego. Rather, he was joining Biocom on one of its many annual trade missions. This one would be to explore potential business opportunities in Provence-Alpes-Côte d'Azur.

While the average person might know this region of France for its beautiful landscapes and Mediterranean coastline, biotech insiders know it's also home to some 500 health care companies; a host of leading academic laboratories in immunology, infectious diseases and cancer; and a booming clinical trial scene. Those are among the factors that convinced Biocom President and CEO Joe Panetta to forge a partnership with the life science industry association in the South of France.

As part of its four-day trade missions, such as the most

recent one in September of last year, a small group of Southern California biotech industry executives tour through Nice, Toulon and the region's capital city of Marseille, meeting with leaders at businesses and academic centers to find areas of collaboration.

"I decided to go, but I didn't really know what to expect," recalls Dr. Messmer, a faculty member at University of California, San Diego Moores Cancer Center and CEO of San Diego-based Abreos Biosciences. Abreos is developing tools to enable precision dosing of biologic medicines.

"During the trip, I was introduced to a number of people at Institut Paoli-Calmettes, the cancer institute of Marseille," he explains, "which ultimately led Abreos to create a French subsidiary that can do clinical trials in France."

It also led Abreos to find a talented French intern who is currently working in the lab at the company's San Diego headquarters. If all

goes well, Dr. Messmer said, she will be able to join the company in the Marseille office when her internship ends, helping to spread the company's culture of innovation with the rest of the team in France.

For Abreos and many other California life science companies, a European subsidiary — or at the very least, a Europe-based partner or collaborator — makes strong business sense. Not only is the CE mark easier to acquire than FDA approval for medical devices, but Europe represents a huge market for medical products and services.

“It’s our second-biggest market,” Dr. Messmer says. “Our value proposition, that we can save the health system a lot of money through precise dosing, also resonates strongly in Europe, maybe even more so than here in the U.S.”

While it’s too soon to call the Marseille subsidiary a success, Dr. Messmer says it’s been an interesting ride so far — and one he doesn’t regret.

“We’ve learned that it’s horribly difficult to set up anything in a foreign country...and you have to get used to having teleconferences at 7 a.m. Pacific Time, while they’re sipping wine,” he laughs. “But coming from academia, I appreciate how international collaborators think a little differently and how they will challenge your business model.”

Japan Continues to Blossom

When it comes to building international connections for its member companies, Biocom doesn’t stop at Europe. In fact, it’s Japan that Panetta has called Southern California’s most important foreign partner today.



Pre-dating the South Bio Alliance in France, which started in 2014, Biocom launched a similar initiative to bridge life science companies in Japan and Southern California and create greater awareness of opportunities in Japan.

“FOUR YEARS AGO WE HAD FEWER THAN 10 JAPANESE COMPANIES AS MEMBERS OF BIOCOM. WE’RE AIMING TOWARD 50 BY THE END OF THIS YEAR.”

- TONY FUJITA, MANAGING DIRECTOR OF BIOCOM JAPAN CONSULTING

In addition to organizing delegations to visit Japan and meet with key business leaders, the program — now in its fifth year — also has paid off through the formation of Biocom Japan Consulting, led by Tony Fujita, a Japan native with strong ties to industry and government leaders there.

Through the consulting operation, members of Biocom have access to strategic advisory services and to help facilitating partnership discussions with companies and government entities in the U.S. and Japan. Fujita and his team help California’s life science companies strategize their entry into the Japan market, plan business development and product launches, orchestrate manufacturing, manage acquisitions, and handle financing and investments with Japanese partners.

Among Biocom’s 40-plus Japan-based members are Althea Technologies (owned by Ajinomoto), Astellas Pharma US, Takeda San Diego and Nagano Sciences USA Inc. Japan-based members also are invited to leverage Biocom for strategy and business guidance.

“Four years ago we had fewer than 10 Japanese companies as members of Biocom,” Fujita says. “We’re aiming toward 50 by end of this year.”

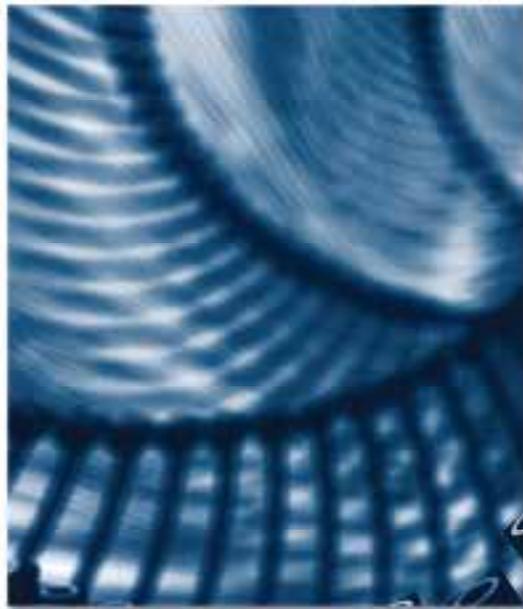
In addition, more than 20 companies from Japan now participate in Biocom’s annual Global Partnering Conference, he says: “The reputation of the conference is spreading by word of mouth.”

Looking ahead over the next 12 months, Fujita says he is working to start a similar partnering conference in Japan, and to forge a stronger collaborative link between the academic research organizations in Japan and Southern California. He also sees opportunity in the Japanese venture capital market, with plans to spur their investments in California’s biotech startups.

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Sizing Up California's Life Science Exports

World Trade Center San Diego, part of the San Diego Economic Development Corporation, concurs that Japan — along with developed nations in Western Europe and increasingly China — make up the lion's share of foreign activity in San Diego.

A good part of that activity is related to U.S. exports going overseas.

"Hard data show that companies who export tend to create more jobs and diversify their sales portfolio," says Lauren Lindner, director of World Trade Center San Diego.

Diversification through exports to foreign market is important, as it insulates companies against local economic downturns. Not to mention that more than 70 percent of the world's purchasing power is located outside of the United States.

While dairy and defense are among the best-known industries for exports from California, the life sciences play a major role in fueling innovation and health care around the world.

According to the just-released 2017 Biocom California Economic Impact Report Databook, foreign exports of life science goods and services exceeded \$28 billion in 2015.

Medical devices and diagnostic equipment make up the largest share of foreign exports, at \$12.2 billion, followed by biopharmaceutical manufacturing at \$9.5 billion. Other life science exports include biorenewables, life science wholesale goods and R&D work, according to the report.

To break it down region-by-region, Southern California leads the state in total life science exports, with more than \$12.5 billion in 2015. Northern California was just slightly below that, reaching almost \$10 billion. Within Southern California, Orange County exports totaled more than \$4 billion, Los Angeles approached \$3.4 billion and San Diego totaled about \$3.3 billion.

But Lindner notes that while life science exports are key for fueling the regional economy, it's also important to attract direct foreign investment. This could mean a foreign company opening or expanding an office here, taking a stake in a local company, or perhaps making a full acquisition.

The World Trade Center acts as host to the initial foreign-inbound delegations, and "more than 60 percent of the time, these delegations want to talk biotech," Lindner says. She said the World Trade Center has received notable interest from Switzerland

in our regional pharma capabilities, as well as an overall upswing in interest from organizations based in China.

"We're starting to see more delegations interested in genomics specifically," she adds. San Diego is being seen globally as a hotbed for genomic innovation, thanks in no small part to Illumina's headquarters here and the many subsequent startups that are benefiting from the talent pool and synergy with academic and industry innovation.

"HARD DATA SHOW THAT COMPANIES WHO EXPORT TEND TO CREATE MORE JOBS AND DIVERSIFY THEIR SALES PORTFOLIO."

- LAUREN LINDNER, DIRECTOR
WORLD TRADE CENTER SAN DIEGO

It's BIO Time: Welcoming International Life Science to San Diego

As diverse facets of the global life sciences industry convene in San Diego this June, Biocom and the World Trade Center are together preparing for an upsurge in delegations wanting to explore the regional life sciences landscape, Lindner says.

Along with BIO, they've developed an online platform, **DiscoverSDBio.com**, to help connect visitors and delegations with businesses in the community.

"If you're an international delegation and you want to get off the tradeshow floor to see the greater biotech ecosystem, this online tool will automatically reach out to the companies you're interested in seeing," Lindner says. "It's a way to streamline the process at a time when there are dozens of delegations coming in all at once."

Kelly Quigley is content director at Canale Communications Inc.

By Hilda Mwangi, Esq., MBA
Department for International Trade
and David Pasquini
UK Government Office, San Diego

A Momentous Year for UK-US Relations

2016 was a momentous year for US-UK relations in Southern California. In October, the UK opened its San Diego office, managed by Government Affairs Officer, David Pasquini, and Life Sciences Officer, Hilda Mwangi, collectively known as team #UKinSD. This development reinforced a well-known fact—that San Diego is becoming an increasingly global city. In 2015 alone, trade between San Diego and the UK reached \$540 million, a compelling reason for a visit from a British Government Minister—the first in recent memory. It was an excellent opportunity to hear from key life sciences and energy companies, including Human Longevity, tour Thermo Fisher Scientific and Illumina, and engage with Biocom during a Fireside Chat with president and CEO Joe Panetta.

Trade figures aside, a central mission of our office is to promote research partnerships and collaborations between universities and industry, especially those aimed at solving acute global challenges. One such challenge is Anti-Microbial Resistance (AMR). Antibiotic-resistant “superbug” infections currently claim 700,000 people per year, a figure projected to skyrocket to 10 million lives each year by 2050 if no action is taken. We are therefore extremely proud of two San Diego companies, Forge Therapeutics and Cidara Therapeutics, which received more than \$15 million from CARB-X—a UK-US research consortium focused on AMR research. This award, alongside the UK’s commitment to allocate \$1 billion towards the life science industry (\$375 million dedicated towards research and innovation), will ensure that companies are continuing to work across borders and time zones to solve pressing challenges. Despite an 8-hour time difference between San Diego and the UK, a fact that could complicate most partnerships, Forge and EvoTec AG’s UK researchers have accel-

erated their AMR research through a round-the-clock model. When the UK’s day ends, the US’s begins—a win-win for the companies and healthcare consumers.

Another rising challenge is determining how robots, still in their infancy, can one day work seamlessly alongside doctors and patients to make healthcare more efficient in hospitals and care facilities around the world. In May, the office hosted a delegation of leading UK robotics researchers who were travelling across the US to discuss the theme of human-robot interaction in healthcare. The group featured top talent from centres in Edinburgh, Sheffield, Leeds, Bristol, London, and Surrey. Naturally, San Diego was a

“must see” for the delegation, given this region’s leading position in robotics research and how those technologies are woven into San Diego’s robust healthcare sector.

The group spent two days engaged in dialogue and demonstrations on everything from surgical robots and mimicking muscle tissue at UC San Diego’s Contextual Robotics Institute to using Virtual Reality to measure physiological responses in patients with neurological

diseases at San Diego State University’s Neuromechanics and Neuroplasticity Lab. In true British style, they engaged with San Diego’s robotics engineering community over pints at San Diego craft beer staple, Rough Draft Brewing Company.

What’s in store for the second half of 2017? In the fall, the Mayor of San Diego, Kevin Faulconer, will lead a delegation of businesses and academic institutions to the UK for his inaugural European visit. Organized by the San Diego Regional Economic Development Corporation, with help and counsel from the #UKinSD team, the Mayoral Mission will focus largely on the tech and life science sectors. The main objective of this mission is to promote San Diego



businesses and initiatives across these industry sectors, spotlight recent SD-UK business deals, and establish connections that will lead to long-lasting and profitable partnerships.

Our next and biggest event is the BIO International Convention this June. We are pleased and excited to welcome a large UK delegation of biopharma companies, researchers, professors, and clinicians. As the second-largest BIO international delegation partner, we look forward to meeting and interacting with US and other internationally-based companies at the Great Britain Pavilion, Booth #4827. Interested companies and delegates are encouraged to reach out to UK companies via BIO's Partnering System, or better yet, stop by the Pavilion and enjoy some British sweets and tea-time snacks as you learn more about the UK's life science offer. We'll also be serving British pints at the Pavilion during our Networking Stand Reception on Tuesday, June 20. Let's continue this streak of San Diego-UK collaborations!

For life science trade & investment inquiries, please email: Hilda.Mwangi@mobile.trade.gov.uk.

For all other sector, government affairs, and press inquiries, please email: David.Pasquini@fco.gov.uk

To find out more about the Department for International Trade, please visit great.gov.uk.



Hilda Mwangi serves as Vice Consul- Life Science, Department for International Trade



David Pasquini is Consul, Government and Prosperity, UK Government Office, San Diego



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By Jimmy Jackson,

Senior Vice President of Public Policy & Chief Policy Officer, Biocom

Thinking Globally, Acting Locally (and in Sacramento and Washington)

Over the past several years, the life science industry has become increasingly global in its focus. Companies seek drug and device approval in other countries before the U.S., nations have attempted to fortify their patent laws in response to concerns about IP infringement, and more clinical trials are being conducted internationally. In order to stay competitive in the global marketplace, Biocom's Public Policy department continues in its role to ensure our member companies have the resources to succeed.

One of the unquestioned leadership spaces for the United States is in accelerating research. But other countries have been steadily increasing investment in specialized higher education and in funding of research over the past decade. Alarming, in the first budget proposal of his administration, President Trump proposed to REDUCE funding for the National Institutes of Health (NIH) by \$1.2 billion this fiscal year (2017), and an almost 20% cut for the 2018 fiscal year.

Biocom has made it our top priority to defeat the \$5.8 billion cuts to the NIH in 2018 proposed by the Trump administration and advocate for increased funding for the agency. In addition to lobbying Congressional offices directly, we also launched an online advocacy campaign, allowing individuals to send letters to their legislators urging them to protect NIH funding directly from our website's action center. This action center will be central to our future advocacy efforts to unite the industry with a common and substantial voice. On May 4, legislators passed a spending measure funding the government for the remainder of FY2017 which increases the NIH budget by \$2 billion, the level previously agreed to and for which Biocom had been advocating. As Congress turns to FY 2018 funding bills, we will continue to ask for an additional \$2 billion increase for the agency.

In other exciting news, at the beginning of this year, Biocom hired a manager of regulatory affairs in our Washington, D.C. office. Brittany Blocker is working to better unify and support the federal regulatory needs of our members, including submitting comments on matters of significance and connecting to personnel at the FDA, CMS, and the NIH, among others. Brittany has industry experience preparing FDA submissions and will be an invaluable addition on behalf of our members. Since her hire, Biocom has initiated a regulatory affairs newsletter and has increased our value to the regulatory affairs community by offering professional certification credits for our committee meetings.

At the state level, the industry is facing another effort, SB 17, to require prescription drug manufacturers to provide 90-day advance notice, including proprietary pricing information (which would be published on a state website), regarding planned increases to the wholesale acquisition cost of drugs exceeding certain minimal thresholds. Dr. Steve Mento, a board member of both Biocom and BIO, testified before the Senate Health Committee in opposition to the bill, discussing the myriad of problems the bill would create for small companies. Although the bill passed, several of the committee members expressed reservations about the current language and encouraged the author to further address issues and concerns raised in the hearing.

The industry is also facing efforts to levy a tax on opioids to pay for abuse and addiction programs, a proposed ban on industry-run patient co-pay assistance programs, and a probable return of legislation to mandate industry-funded unused drug takeback programs. You can learn about the progress of these proposals in Biocom's BCQ Newsletter.

On the local front, Biocom has initiated extensive outreach to local governments within Los Angeles County and the Bay Area, including meetings with economic development offices in both regions. On May 23, Biocom held its first Bay Area Facilities and Environmental Health and Safety (EH&S) Committee meeting and we'll be holding our first Facilities and EH&S Committee meeting serving Los Angeles on June 27. We look forward to helping unite industry professionals in both the Bay Area and Los Angeles County with quarterly meetings of these committees so that they can share best practices and common issues. We expect the committees in both areas to be robust and will quickly lend themselves to helping Biocom increase its service to its members.



Jimmy Jackson is the Senior Vice President of Public Policy and Chief Policy Officer for Biocom. He oversees government affairs and public policy for the organization.

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By Kelly Quigley, Canale Communications

An Eye for Solving a Global Epidemic

The story of Freedom Meditech is a case study in the power of a thriving regional life science ecosystem.

To say that Craig Misrach had an ambitious vision in 2006 when he founded the medical device company Freedom Meditech would be an understatement.

After earning his MBA at University of Virginia and moving back to San Diego, he was on the search for a business opportunity that would help him “solve a massive global problem.” And he found it fairly quickly after poring through data on the diabetes screening market.

“I just couldn’t believe that people with diabetes still had to prick their finger to get blood glucose information,” he said. “I started looking at all of the attempts to create a truly non-invasive glucose monitoring device.”

Through this research, he found that “probably a billion dollars” of venture capital had gone into these efforts, but none of the devices had achieved FDA clearance. Most of the methods were skin-based, but interestingly, a couple involved the eye.



The ClearPath DS-120 is the only non-invasive diabetes diagnostic device that is 510(k) cleared by the FDA for market and sale in the U.S.

The ClearPath device scans the lens of the eye in six seconds using autofluorescence to detect the presence of advanced glycation

end products, or AGEs, which are proteins that signal a worsening of many degenerative diseases, including diabetes.

The FDA cleared the non-invasive device in 2013, enabling optometrists and ophthalmologists to use it to screen patients for diabetes. The device also has been cleared in Europe and Canada.

In the U.S. alone, the number of diabetics is estimated at 21 million, with a financial impact of \$245 billion. Through screening and early diagnosis, healthcare professionals and patients can improve outcomes and lower costs to the healthcare system, Misrach says.

In over a decade, through multiple rounds of venture funding that exceeded \$14 million, the company expanded commercialization and

eventually caught the eye of Chinese health care company, Sinocare Group. In January 2017, SinoCare’s U.S. subsidiary, Trividia Health Inc., acquired Freedom Meditech’s technology for an undisclosed “seven-figure” amount, with plans to expand the device to more than 48,000 pharmacies in the U.S. and beyond.

Misrach expects the technology to ultimately become widespread in Sinocare’s home market of China, which has the largest diabetes population in the world.

Reflecting on his many years of growing Freedom Meditech, leading to its acquisition earlier this year, Misrach says he was motivated by the success of other local diabetes care companies, including Dexcom, which have dramatically improved patients’ lives by simplifying glucose management. He also relied on a host of San Diego networks, notably Biocom.

“Through Biocom, I surrounded myself with individuals who were way smarter, way brighter than I was, and with the technical expertise I didn’t have,” he says.

Freedom Meditech also conducted its first clinical studies in 2010 at XiMED Medical Group - Scripps Health, and later at the UTC Lens Crafters, where a steady flow of UCSD students made for willing trial participants.

“It’s really a testament that you don’t need to leave San Diego to build a successful commercial business that can have a global impact,” Misrach says.

Kelly Quigley is content director at Canale Communications Inc.

“IT’S REALLY A TESTAMENT THAT YOU DON’T NEED TO LEAVE SAN DIEGO TO BUILD A SUCCESSFUL COMMERCIAL BUSINESS THAT CAN HAVE A GLOBAL IMPACT.”

- CRAIG MISRACH, FOUNDER & FORMER CEO, FREEDOM MEDITECH

“I like the road less traveled, so I started looking at the non-invasive ophthalmic ways to extract sugar information from your eye,” Misrach says. “I thought there must be something there.”

He identified a promising technology platform, but in 2009, he in-licensed a second technology that provided a faster, clearer path to FDA approval. In fact, the name of the product was ClearPath. “It motivated more investors to come on board because the risk profile was more digestible,” he says.



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Suman Kanuganti, MBA '14
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When, Why, and How to Avoid Dilution in a Life Science Company

What is dilution, and why should you care? The topic of dilution can make people cringe, especially if they have personal experience watching the value of their company shares decline, thanks to dilution. The effects of dilution on shareholders and investors can be likened to someone taking money out of your wallet. Let me explain.

Investopedia defines dilution as: “a reduction in the ownership percentage of a share of stock caused by the issuance of new shares. Dilution can also occur when holders of stock options, such as company employees, or holders of other optionable securities exercise their options.” In other words, dilution is the decrease in stock value as the company issues more shares and as options are exercised.

When and why does dilution happen, and how can you avoid or minimize it?

Dilution typically happens when more shareholders are brought into a company by selling additional ownership shares. For a cash-burning life science company, raising additional funding by selling more shares is an unavoidable necessity. However, there are well known ways to finance which minimize dilution: sell equity on good news when the company's value goes up (still dilutive); finance with debt instead of or in addition to equity (much less dilutive); and secure partnerships that provide funding without requiring any equity (the least dilutive, but may cap upside if you partner away key assets, or the company may be too early-stage to find partners).

Most life science companies are cash burning vs. profitable and carry significant development risk, thus they are not good candidates for traditional commercial debt. However, there is a particular type of debt financing that does not mind the risk or the lack of profits. This is called venture debt. While venture debt is not entirely non-dilutive because it typically includes warrants (options to buy shares at today's price sometime in the future), it is much less dilutive than equity. Venture debt is typically senior secured debt with warrants, and is provided by venture debt companies and a handful of banks that are experts in this space. Both private, VC-backed companies and public companies use venture debt routinely. In fact, every year, the market for venture debt in life sciences reaches into billions of dollars.

When is it a good idea to finance with venture debt vs. equity or partnership dollars?

Venture debt is useful any time you can build equity value using debt, while the downside risk (of losing value of the enterprise) is such that even if the worst scenario comes true, there is still an enterprise left that can pay back the debt while it finds another way

to future success. The best venture debt partners will not leave the company when it runs into difficulty, but are capable and motivated to keep supporting the company as it develops and executes on a new plan forward.

Perhaps the most obvious value of raising venture debt comes from extending the runway of a company past the milestones that have been funded by equity dollars. If you meet your milestones as originally planned and the company is funded by equity, but is running on fumes and nearly out of cash, you don't have adequate leverage to negotiate good terms for that next equity financing, be it an equity round, partnership or IPO. If you have ample cash runway to help to create an auction around your next financing, with multiple options to choose from, you are likely to benefit from better terms on your equity financing, which reduces dilution.

Another excellent time to use venture debt is to finance acquisitions and in-licenses of assets or entire companies. It may be that for risk mitigation for the lenders, a combination of equity and debt will be required; even if so, the resulting financing will be significantly less dilutive than an equity-only financing would be. Similarly, venture debt is a good tool for funding companies that are close to getting sold.

Often, equity funds one or a couple of lead programs, but if there are additional programs of potential high value that spring up during development that did not get funded by equity, then debt can be used to accelerate their development. Lenders typically like diversification of the underlying asset pool that happens as a result of such acceleration.

Last but not least, venture debt is a good less-dilutive source of capital to accelerate growth for companies that are commercializing, but not yet profitable.

The trick with venture debt is to make sure you don't take too much of it. Fortunately, lenders are very good at figuring out what is the right amount of debt for a given company's stage and risk profile, so over-leveraging of life science companies by venture debt does not happen often. A good rule of thumb is to work with partners who have been in the business for a long time, have gone through business cycles without leaving the space, and who are as patient as they are experienced.



Killu Sanborn, Ph.D. serves as Senior Director of Business Development at Oxford Finance, LLC

By Michelle Nemits,
Director of Business Development, Biocom Purchasing Group

Growing in the Bay Area and Beyond

With eight full months on the ground in the rich life science cluster that is the greater San Francisco Bay Area, Biocom's mission here is being enthusiastically embraced. The diversity of the science conducted here challenges our traditional notion of what "life science" is. With close proximity to the tech community in Silicon Valley, life science in the greater Bay Area encompasses everything from traditional pharmaceutical and biotechnology drugs and therapeutics, to cutting-edge CRISPR and liquid biopsy research, to innovative artificial intelligence and digital health applications, to seemingly futuristic synthetic biology endeavors into "clean tech" and "clean food." The industry companies, startups, incubators, accelerators, and research institutes, along with the world class service provider community, makes the Bay Area a very concentrated hub of creativity and innovation. It also underscores the need for the kind of cluster-focused advocacy and community-building infrastructure that Biocom is uniquely qualified to provide.

We are quickly approaching 150 member companies here in the Bay Area, and still expanding. Our members have a contagious desire to engage and build a cohesive ecosystem with us, which is exciting and rewarding. Two recent events came out of this rapidly growing membership base. The first is the hiring of our second Bay Area employee, Kristen Duncan, Business Development Manager. Kristin brings solid industry experience with her, having previously worked in Quality Assurance at Genentech's Vacaville manufacturing facility and at VWR International supporting UCSF. She is focused on working with our Purchasing Group supplier partners to onboard new members and ensure they are benefiting from the unparalleled cost-savings opportunities available to them through our group purchasing discount contracts.

The second recent event was our first Bay Area Open House on April 26 in San Mateo. Biocom President and CEO, Joe Panetta, as well as Jimmy Jackson, Senior Vice President and Chief Policy Officer, Shaye Exner, Senior Director of Conferences and Corporate Sponsorship, and Liisa Bozinovich, Executive Director of the Biocom Institute, were all in attendance to provide insight as to how Bay Area members can

engage with Biocom through our public policy and capital development initiatives, our STEM outreach and workforce development efforts, and through our various networking and professional development events and committees. Our supplier partners ThermoFisher Scientific, BioSurplus and Barney and Barney also participated to ensure members are aware of the market-leading cost-saving programs available to them through their membership. Attendees included representatives from companies as diverse as Genentech, Gilead, 10X Genomics, Global Blood Therapeutics, Berkeley Lights, Bolt

Threads, and IndieBio, to our partners at California Institute for Regenerative Medicine (CIRM), the state's \$3 billion stem cell initiative, and local Economic Development Committees. It was a highly interactive and informative session and a great start toward unifying the Bay Area life science cluster.

Moving forward, we intend to build on the momentum we have generated and become the unifying force that is vastly needed here in the Bay Area. By the time this issue of Lifelines reaches you, we will have launched our Bay Area Facilities and Environmental Health and Safety Committee. Our Bay Area Human Resources Committee is well underway; they are laying the groundwork for our upcoming 2nd Annual Bay Area HR Conference, which will be held in November. Finally, we will soon launch our Bay Area Procurement Roundtable, which will bring together local procurement and supply chain professionals and provide a platform for them to convene regularly, share best practices and network with each other. Susan Jue, Procurement Manager at Global Blood Therapeutics and an active member participant in many Biocom events, noted "Biocom's extensive outreach and programming brings long lasting benefits to all its members."

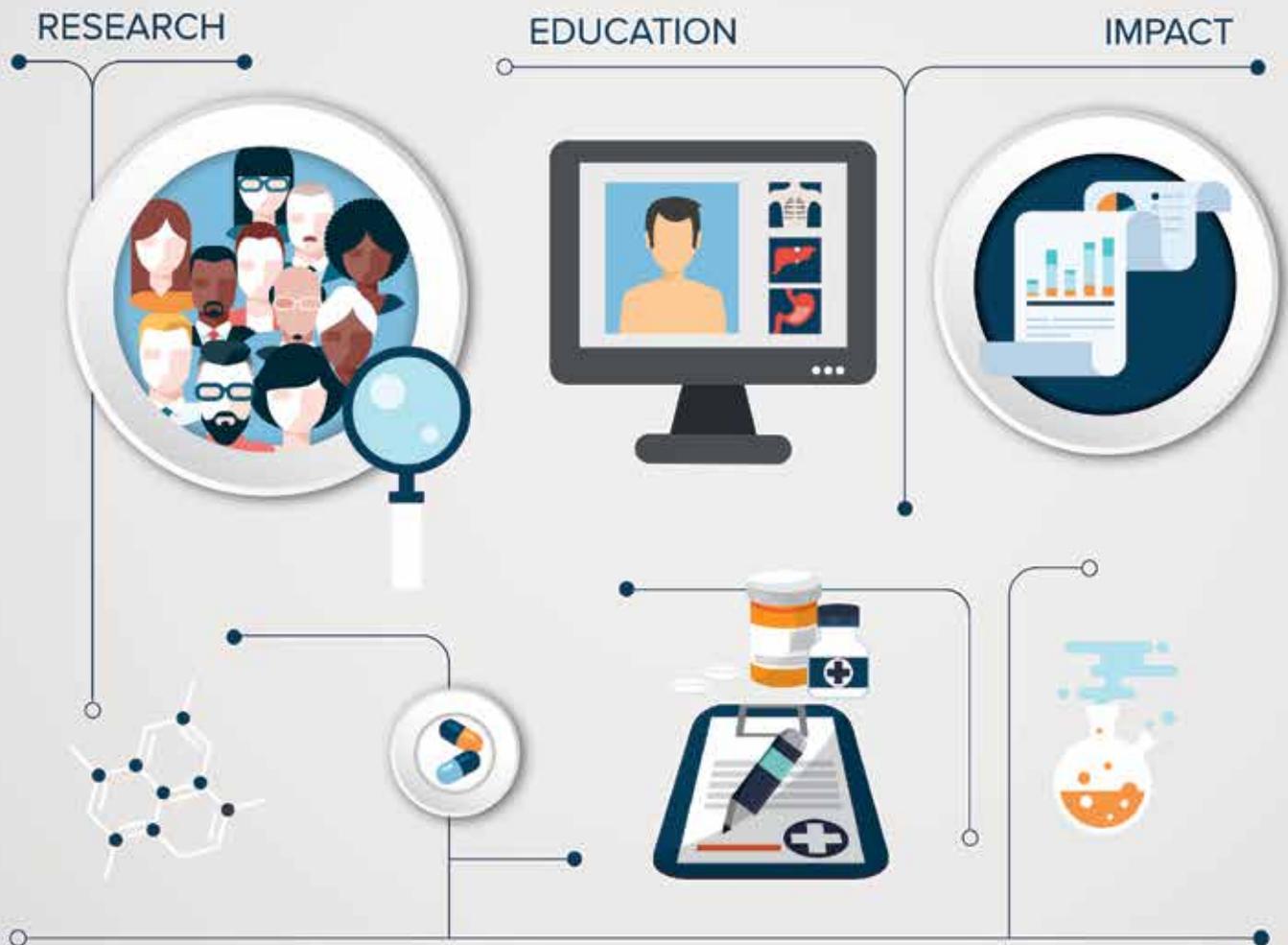
We will continue our outreach to the local Bay Area city and county policymakers, as well as the Economic Development Committees and Chambers of Commerce, building on similar successful initiatives we have already implemented in San Diego

"BIOCOM'S EXTENSIVE OUTREACH AND PROGRAMMING BRINGS LONG LASTING BENEFITS TO ALL ITS MEMBERS."

**- SUSAN JUE, PROCUREMENT MANAGER,
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and Los Angeles. This means Biocom will unify the State's three distinct life science clusters with consistent, targeted, and customized solutions that will strengthen each cluster individually, and the California life science industry as a whole.

To say that Biocom's experience in the San Francisco Bay Area has been a whirlwind of activity would be to vastly understate the situation. The Bay Area is widely recognized as a powerhouse life science cluster, but when one digs in and starts to see all the parts that comprise the whole, one quickly realizes that there is an army of citizens, companies and communities that are fully invested in the mission of improving the human condition. Biocom is immensely proud to be the state's largest and most influential life science association in California, and committed to engaging with and representing this thriving and important Northern California life science cluster.



Michelle Nemits is the Director of Business Development in the Bay Area.

PHOTO FROM GIANT'S GAME WITH THERMO FISHER



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*By Dina Lozofsky,
Executive Director, Biocom LA*

Los Angeles: California's Gateway to International Business

It is well known that Los Angeles is a gateway for international business, and that presents a wealth of great opportunities for the growing life science cluster in Los Angeles. It is yet another way we can differentiate ourselves from other life science hubs around the nation. Almost 23 million international travelers came through LA International Airport in 2016, approximately 30% of the total traffic through that airport. Los Angeles also has 101 foreign Consulates, which includes 65 career Consulates General and 36 honorary Consulates, making it the highest concentration in the world (according to the LA Consular Corps), as well as foreign trade organizations such as Biocom member, UK Department for International Trade.

LA County is also the largest county economy, with an annual GDP of more than \$664 billion and is home to more than 18 million consumers in the greater LA area, creating a stable and attractive marketplace for international business. From the life science industry perspective, this also means that we have a large and diverse patient population for companies developing new therapies and diagnostics.

All of these factors have resulted in a greater focus on Los Angeles as a location for foreign firms to choose us for their US headquarters or for LA-based companies to explore collaborations with foreign companies or establish their own footprints in countries overseas. This is particularly true with respect to collaborations with companies in Asia, because of our proximity and ease of travel. Biocom's LA and Japan offices have been working to foster more collaborations, uniting life science companies in both regions, including working with the Japan External Trade Organization (JETRO), providing valuable connections and looking to host future joint events.

Los Angeles is also home to Biocom member North American (LA) Representative Office of Zhuhai, China, which is responsible for educating and attracting collaboration between North American companies and Zhuhai, a hot spot for biotech innovation and manufacturing in south China, China's largest pharmaceutical market. "Los Angeles, with its strong trade relationships with China, was a natural choice for our North American Representative office location. There are already a number of strong Zhuhai-southern California business partnerships, and we are excited

about opportunities for further collaboration. We are delighted that Biocom has opened an office here in LA, which in such a short time, has already helped to spark interest and open up partnership opportunities within the local health sector industry cluster," said Devorah Kaufman, Director, Business Development.

All of this makes Los Angeles a great focal point for interactions with international companies and provides us opportunities to unite our efforts with those of our partners overseas. The BIO International Convention is just one example of the great ways we can seek partners. Biocom member USC Stevens Center for Innovation, for example, has taken the opportunity presented by the 2017 BIO International Convention located just south of us in San Diego, to host the 3rd Pan-American Licensing Executive Society Young Members Congress Event just before the convention—knowing that this timing would encourage more participation and leveraging the ease of travel to Los Angeles.

As you read this, Los Angeles will have also just been host to the 2017 SELECT LA Investment Summit, Southern California's premier international trade event that brings together hundreds of global investors with local business and governmental leaders to facilitate and secure foreign direct investment and provide exclusive insights on market trends and opportunities in the Los Angeles region. One of the additions to the event this year was a bioscience panel, recognizing the rise of the life science industry in Los Angeles. I was honored to have been invited to participate in this discussion of the intersection of healthcare and technology and the importance of industry-related investments in what has become one of the hottest industry clusters in LA County.

Stay tuned for more updates on the growing life science ecosystem in Los Angeles and our deepening connections with our partners abroad.



Dina Lozofsky is the Executive Director of the Biocom Los Angeles office.



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By Liisa Bozinovic,
Executive Director, Biocom Institute

From Service to Life Science

We are grateful to the men and women of the United States military who serve our country. As these brave individuals transition to the civilian sector, Biocom works to engage and embrace those who wish to join the life science industry.

In 2010, through the Biocom Institute, we embarked on an initiative to support many San Diegans, including veterans with the BRIDGE Project. The program was made possible by a \$4.95 million American Recovery and Reinvestment Act grant. This three-year grant led to the Institute's creation of the Life Science Immersion Program, including internships for under/unemployed San Diegans. Veterans quickly became a logical cohort for this program. Human Resource professionals readily convey that veterans frequently possess a number of attributes that make them exceptional long-term employees: discipline, ability to follow procedures, quantitative thinking, problem solving, strong work ethic, reliability, attention to detail, consistency, commitment, dedication, strong work ethic, and reliability.

The BRIDGE program ended in 2013, and our work with veterans continued. Over time, employees of member companies who were themselves veterans eagerly engaged with us and helped to form our Veterans Initiative. Veteran life science employees expressed a strong interest in giving back to their fellow veterans. Many of them have great stories to share, especially regarding mentorship. As a result, in 2014, the Institute's Veteran Career Mentoring Program was launched. This program involves many excellent elements that our veterans find valuable. Coincidentally, the mentors have discovered something—veterans possess an unexpected and highly in-demand quality: leadership and team building skills.

The Institute's 2016 Talent Report: California Workforce Trends in the Life Science Industry report concluded the following: "As businesses increasingly require employees to collaborate and work across functional areas, the search for or development of improved soft skills for employees in all functional areas is important. Finding the required technical skills in new talent is easier than finding candidates with strong soft skills (e.g., leadership, communication, self-awareness, team- building and empathy)." Overwhelmingly, life science employers reported lack of soft skills as one of the biggest challenges with employees. In our work connecting transitioning veterans to opportunities in life science organizations, the HR community has shared that what makes veterans great employees are their advanced soft skills.

Frustratingly, only 10% of 77 California companies surveyed having 25 or more employees, have a formal veteran hiring initiative. Clearly there is more work to be done and the Biocom

Institute is uniquely positioned to make a significant impact. Further support for that statement comes from a data point related to the 248 California life science companies surveyed about the best methods for sourcing talent. Referrals topped the list at 88%, much higher than job postings at 70%; an indication that who you know really does matter.

In 2017, we've kicked it up a notch. The year started off with a visit from Lieutenant Robert General Caslen, Jr., the Superintendent of the United States Military Academy at WestPoint. 50 Biocom members heard General Caslen discuss his many goals and priorities. He spoke with great empathy, recognizing the sometime difficult transition of military personnel into the civilian sector.

The General's visit sparked increased interest in our committee and led to new program development. First, we'll be hosting a veteran career panel entitled "From Service to Life Science", kicking off the Talent Connect Career Fair at this year's BIO International Convention on June 22nd. Talent Connect is open to veterans and others interested in interviewing for life science jobs. Then, on October 13th, we will be hosting the first annual fall Veterans Transiting into Life Science Conference. Our vision for this conference is for veterans to get the inside information on careers in life science, through a series of presentations, panels and workshops. In spring 2018, we plan to host a career fair, where veterans can interview for internships or full-time jobs. Between these two events, we encourage veterans to take advantage of the mentoring, workshops and networking offered through the Institute.

If you would like to get involved or learn more about our veteran initiatives, email lbozinovic@biocom.org.



Liisa Bozinovic is the Executive Director of the Biocom Institute.



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CBRE KILROY

By Rick Fultz,

*Chief Business Development Officer, Biocom
Managing Director, Biocom Purchasing Group*

Region-Specific Focus, Global Strength and Reach

The past five years have yielded incredible growth for the Biocom Purchasing Group. In 2012, we thought we had the market saturated with 600 customers, yet we're now serving over 900 members globally, and adding new ones every day. To put that in perspective, the correlated savings we provide, one of the most easily quantifiable measures of our success, has gone from tens of millions of dollars annually to trending over two hundred million dollars in 2017.

Much of this success is attributed to our tenured members who have become brand ambassadors; those dedicating their time, building trust in our process and advocating for better programs and an expanded reach every step of the way. The emphasis has been placed on collaboration over competition here at the Biocom Purchasing Group, and the results are speaking volumes with every new venture that comes our way.

With over 900 life science member companies and two additional affiliate programs reaching 1,700 more, we have found ourselves holding a strong hand at the negotiating table with prospective supplier partners. Add in Biocom's expansion up the coast to Los Angeles and the Bay Area and across the Pacific to Tokyo, and decisions made in the conference rooms at our San Diego headquarters now have implications felt around the world.

Major changes can be felt across our organization as a result of this greater responsibility. Our Biocom Purchasing Group Board of Directors, for example, challenged us at the end of 2016 to put a strategic plan in place for the first time in our company's history. "What is Biocom Purchasing Group's 5-year plan?" they asked. "It's not enough to just grow organically and celebrate small wins anymore. With the building momentum of the California life sciences industry and the unprecedented critical mass of Biocom members, Biocom Purchasing Group needs to take a leading role in guiding industry best practices and delivering value and service never before seen from a group purchasing organization."

Initiatives to deliver on these directives are already in motion. As a start, we have codified a new mission statement, referenced daily as our guiding principle: As a trusted advisor, we aim to accelerate life science success by leveraging innovative, member-driven, strategic sourcing solutions that

significantly lower the total cost of business. Our success is measured by our customers' ability to compete globally and positively impact the human condition.

Our vision is to be the best group purchasing organization in the world and to be recognized as the most valued business partner in the eyes of our customers and suppliers alike. We're making adjustments to our savings portfolio to reflect this new caliber of programming, supported by a transformational effort to become even more member-focused and data-driven in identifying the resources required to accelerate innovation.

We're also starting to see the positive effects our growth has had on our ability to renegotiate stronger contracts that are attractive to even our larger, international members. With that in mind, our contracts team has been given the green light to scan the horizon and engage in RFPs for new products and services that were once out of scope for our smaller GPO.

Success in Southern California alone is no longer enough for our team. We will equip all of our customers with the tools needed to compete on the global stage and bring life science success to California and beyond. We'll continue to build on Biocom's strong foundation, with a singular focus on bringing more innovative solutions to every region we serve.



Rick Fultz is Chief Business Development Officer of Biocom and Managing Director of the Biocom Purchasing Group.



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By Sara Pagano,
Managing Director, Biocom Institute Festival of Science & Engineering

A Worldwide Future United by STEM

S-T-E-M...more than just four letters, but a powerful group of words that will continue to change the way the world thinks, and delivers education. Science, Technology, Engineering, and Math are proving to be the highest need in skill sets not just for the future of our great nation, but also for the world at large.

According to the Bureau of Labor Statistics, employment in STEM-related fields will increase by 1 million during the next decade. Graduates with STEM skills and degree backgrounds carry a very diverse range of skills that can be transferred to a multitude of occupations, making students graduating with these degrees the true “utility players” of a growing workforce. Though many of these fields will require a bachelor’s degree or higher, there is still a huge need for blue collar level and skilled trade positions. A 2011 survey (completed by the Bureau of Labor Statistics) of manufacturers found that as many as 600,000 jobs remain unfilled because there is a lack of qualified candidates for technical positions requiring STEM skills—primarily production positions (e.g., machinists, operators, craft workers, distributors, and technicians). A survey (completed by the STEM Education Coalition) said that CEOs of major U.S. corporations in 2014 indicated that approximately 60% of job openings require basic STEM literacy. This information eloquently echoes the importance of science, technology, engineering and math within education at all levels and ages of growth.

There is a definite movement happening throughout the world to unite those students who are on the horizon. There is no shortage of programming to get students and families of all ages excited and engaged in STEM education and learning. Pick a corner of the earth and you can find something riveting that has just happened or about to happen that will give your mind a jolt for science (and technology, engineering and math)!

Take a trip to Calgary, Alberta, Canada and see Beakerhead in full action: an annual program that brings together the arts, sciences, and engineering sectors to build, engage, compete, and exhibit interactive works of art, engineered creativity and entertainment. Beakerhead believes that when you throw open the doors to science and engineering through a welcoming world of art and entertainment, a lot can happen. The core educational purpose leads to outcomes that are important to individuals and society. Stop by the National Physical Laboratory in New Delhi, India and learn about how Vijnana Bharati (VIBHA) has become the Guinness Book World Record Holder for the successful conduct of the ‘Largest Practical Science Lesson’. The feat was achieved in the sprawling campus of IIT-Delhi by 2000 students

from prestigious schools of Delhi. The participants worked in small teams to complete the experiment as part of the lesson that focused on catalysts. Roll over to Edinburgh, Scotland where science theatre is put in the spotlight, showcasing productions for families and adults at The Lyceum, The Festival Theatre Studio or the Traverse and Bedlam Theatre. Then stop in at the City Art Centre where the gallery spaces are transformed into six floors of interactive workshops...discover the wonderful world of bees, create your own coral creature, build humanity’s first Mars colony or scrub up and try your hand at some ER Surgery.

These public events and festivals are just one point on the pendulum. They help to foster the excitement and act as a conduit for that eagerness to then ask the questions of “what’s next?”. What’s next is ensuring that supply for the demand in these areas is available by way of the right education pathways, current curriculum that matches to the future industry needs, afterschool programs, and engagement from industry in the classrooms. A key component in students seeing a future, is the ability for them to have a conversation or hear a story with someone of the same gender or ethnicity who has chosen a path to follow and can share that experience with them directly. These moments often set a course for them that they might not otherwise have thought possible.

Combined these global efforts benefit us as a city, a state, a nation and global community to fill the pipeline for what will soon be called “generation STEM, the future”. Our lives are united daily through science, technology, engineering and math so let’s continue to ignite our students with the same passion.



Sara Pagano is the Managing Director of the Biocom Institute Festival of Science & Engineering.

UPCOMING EVENTS

Biocom Unite Party

Tuesday, June 20th

LA BIO Meetup at the BIO International Convention

Wednesday, June 21st

Los Angeles Facilities/EH&S Committee Meeting

Tuesday, June 27th

Biocom CFO Series: Secrets of Alternative Funding

Wednesday, June 28th

Communicate with Purpose

Thursday, June 29th

Partner Day with Vertex Pharmaceuticals

Monday, July 10th and Tuesday, July 11th

Venture Day with Novo Ventures

Tuesday, July 11th

Bay Area Monthly Meet Up / Mission Bay

Thursday, July 13th

Illumina and Illumina Accelerator Partner Day

Monday, July 17th

Biocom Open House & Supplier Showcase

Thursday, July 20th

EPIC+ Workshop

Tuesday, July 25th

Biocom CRO Series: Concept to Commercial: CMC

Thursday, July 27th

First LA Start-up Resources Committee Meeting

Tuesday, August 8th

Biocom CRO Series: Generics: API Focus

Wednesday, August 9th

Bay Area Monthly Meet Up / Menlo Park

Thursday, August 17th

10th Annual DeviceFest & Digital Health Summit

Wednesday, August 30th

Life Science Young Leaders Educational Series

Wednesday, September 6th

"Leveraging Your Leadership"

Tuesday, September 12th

Biocom CRO Series: Concept to Commercial: Pre-Clinical

Wednesday, September 13th

Biocom's Breakfast Meeting: Cybersecurity

Thursday, September 14th

Medical Device Breakfast: Designing and Implementing Effective Clinical Trials

Wednesday, September 20th

Boehringer Ingelheim Partner Day

Thursday, September 21st

Biocom CFO Series

Wednesday, September 27th

Present Your Data with Impact

Wednesday, September 27th

Biocom Institute Hackathon Kickoff Event

Saturday, September 30th

Eli Lilly & Company Partner Day in San Francisco

Tuesday, October 3rd and

Wednesday, October 4th

Lab & Facilities Oktoberfest

Thursday, October 5th

Biocom CRO Series: Concept to Commercial: Clinical/Regulatory

Wednesday, October 11th

For all Biocom events, visit www.biocom.org

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By Ashleigh Farver,
Senior Manager of Events, Biocom

Global Life Science Partnering Conference Brings A World of Opportunity to Attendees' Fingertips

On Thursday, March 2nd, 2017, Biocom wrapped up its 7th Annual Global Life Science Partnering Conference. Since its founding in 2011, this conference has been an exclusive partnering forum for senior executives, bankers, venture capitalists, and business development professionals from the leading pharmaceutical and biotech companies around the world.

Nearly 300 attendees convened at the sold-out two-day conference, breaking our all-time attendance records by nearly 35%. The buzz generated in the hallways of the Lodge at Torrey Pines was an incredible indicator of the dynamic connections being made between industry colleagues. It was standing room only during the panel discussions, where moderators facilitated discussions between life science and investment thought leaders. We had 24 of the most innovative biotech companies from around the world, present to a room full of potential partners and investors. Unprecedented access to decision-makers was evident by the number of 1:1 meetings, which grew exponentially this year to 344. Within hours of the conference opening, the meeting space was filled to capacity and we had to expand to additional rooms to accommodate the growing number of meetings.

The fundamental aim of the conference has always been to organize a meaningful partnering event for life science companies, connecting attendees from biotech and pharma companies in California and the US, to companies and investors from around the world. The strategic goal of Biocom remains a high priority: to help cultivate and foster collaborations and strategic partnerships for our members and others across the industry. The Global Life Science Partnering Conference is Biocom's largest international conference of its kind, and this year we greeted over 40 attendees from Japan and Europe to Canada and Switzerland, and from elsewhere across the globe. Companies such as Alcediag, a French personalized medicine company focusing primarily on mental health, presented to the group, while German biopharmaceutical company, conoGenetix biosciences GmbH, shared how the company engages in the development of new peptide therapeutics for the treatment of autoimmune diseases.

Biocom is committed to not only establishing ourselves as the trailblazer for our life science companies here in California, but also as the leading life sciences industry gateway amongst our US and Japanese companies, delegates, investors, and government entities. In 2013, Biocom launched its Japan initiative to unite life science companies in both Japan and California, and create greater awareness surrounding potential opportunities in Japan. The Global Life Science Partnering Conference marked the culmination of many years of hard work with our Japanese delegates to deliver on that mission. Biocom helped to advance these relationships by welcoming more than 25 delegates from Japan to the conference. Japanese companies such as

Repertoire Genesis, Meiji Sieka Pharma, Asahi Kasei America traveled to San Diego to participate in the conference. Additionally, our attendees were able to listen in as two of our Japanese representatives—from Riken SBL and Okinawa Protein Tomography Ltd.—presented on initiatives within their companies.

It is remarkable to reflect and recognize how far the conference has grown this year, not only in attendance numbers but also internationally and beyond. We have already begun the planning process for our 2018 conference and our mission of working with the international companies continues to grow. Thank you to our planning co-chairs, Igor Bilinsky, Jennifer Cayer, Jim Schaeffer, and Mark Wiggins. Your continued support and always-productive meetings, personal and compelling emails, and hard work cata-

pulted this two-day partnering event to what we envisioned in 2011.

Save the date for the 2018 Global Life Science Partnering Conference on February 28th–March 1st at The Lodge at Torrey Pines. You can find more information at www.biocomglobalpartnering.org.

“Presenting at Biocom's Partnering Conference this year helped put Forge on the radar of several investors seeking to put money to work in the antibiotic space. The conference not only provided me with the opportunity to meet interested investors face-to-face but also gave me a platform to describe our funding strategy and growth trajectory, which increased momentum leading to upsizing our Series A round. In fact, after my presentation, multiple investors that were ‘circling the hoop’ were now ready to jump into the game and asked if they could participate in the Series A financing.”

Zachary Zimmerman, Ph.D.
CEO, Forge Therapeutics, Inc.



Ashleigh Farver is the Senior Manager of Events at Biocom.

By Mark Field

Chief Technology Officer, Thermo Fisher Scientific

Researchers Find Serenity in the Cloud

Data are the lifeline of research, and like all scientists, Jared Farrar is anxious about his data. He'll even skip dinnertime with family to be in the lab for that last result of the day. Data anxiety often disrupts personal and family life for researchers, drawing them to their lab benches on nights and weekends, while the rest of the world enjoys some downtime. But Jared, an MD-PhD student at Virginia Commonwealth University, decided that while he is eager to see his experiments succeed, he also would rather spend time at home with his family without having to worry about his data.

To strike that critical balance, Jared uses Thermo Fisher Connect, an ecosystem of cloud-based scientific analysis apps, remote instrument monitoring, data storage, and collaboration tools that enable scientists to stay connected to their research, their instruments, their colleagues, and global collaborators, no matter how near or far they are from the traditional lab. "Instead of being tied up in the laboratory all night," Jared says while watching the progress of one of his real-time qPCR runs on his smartphone, "I can go home and eat dinner, and then sit down and do some data analysis right there." With Thermo Fisher Scientific's cloud-based instrument-monitoring apps, experiments can be viewed from anywhere with an internet connection.

Outside of the traditional lab, we use a myriad of cloud-based technologies from the moment we wake up to the time we fall asleep. We rely on tools to connect with friends while we drink our morning coffee, minimize our commute, predict songs we'll love, count our steps, expedite our takeout meal deliveries, remember where in an episode we left off, and optimize our REM cycles. To keep pace with scientific innovation, the life sciences community expects a similar capability to connect to their devices, to each other, and to tools that can help make their lives easier, better, and richer outside the lab.

Thermo Fisher Connect utilizes cloud technology to help tropical disease researchers like Dr. Eisei Noiri access data collected in distant regions of the globe from his laboratory in Japan. Dr. Noiri, an Associate Professor at the University of Tokyo Hospital, studies the deadly *Leishmania* parasite, which is prevalent in south Asia, about 3,000 miles away from his home.

Rather than emailing scattered data files or mailing storage devices to Dr. Noiri, researchers in south Asia can easily upload their data to a shared Thermo Fisher Connect group, which Dr. Noiri can access without leaving his lab. Thermo Fisher Connect helps make Dr. Noiri's research more manageable, turning a

group of distant collection sites into a single, unified data source on the cloud.

Thermo Fisher Scientific is dedicated to growing the ecosystem of connected solutions that help accelerate digital science and meet researchers' rapidly changing needs.

In addition to general experiment setup procedures such as plate setup and pipette protocols, and the ability to conduct data analysis via cloud-based apps, Thermo Fisher Connect's user base of more than 12,000 institutions will have visibility to their labs' vitals—including instrument status, scheduling, and servicing information—with instrument-monitoring tools. Users from select accounts will also have access to self-service product inventory tools, including onsite refrigerators and cloud based management dashboards that help researchers to curate their mix of products and ensure proper stock levels.

The scientific efforts of the past have evolved into an interconnected web of disciplines that fosters connections across scientific fields, technologies, and the planet. As scientists become more immersed in the increased flexibility of scientific thought and application and the data deluge that comes with it, the ever-evolving portfolio of Thermo Fisher Connect's cloud-based and digital technologies caters to researchers' desires for an associated increase in technological flexibility and advancements in scientific research.

Learn more about Thermo Fisher Connect at:
thermofisher.com/connect.

For Research Use Only. Not for use in diagnostic procedures.



Mark Field is the Thermo Fisher Scientific's Chief Technology Officer and is based in Carlsbad, California.

Biocom's Making Headlines

The New York Times

May 24, 2017

California Today: Grabbing Hold of the Life Sciences Industry

By Mike McPhate

The life sciences industry is one of California's strongest economic engines — and it's growing.

A new report by Biocom, a trade group based in San Diego, found that in the last five years, employment in the state's industry grew by 10 percent to more than 360,000 jobs, many of them high-paying.

In the life sciences, research labs and the companies that spin out of them turn science into commercial applications such as gene-editing tools, medicines and fuels derived from plants.

Joe Panetta, Biocom's chief executive, drew a comparison with California's winemaking industry, which generates roughly \$60 billion in annual economic activity.

For life sciences? Roughly \$317 billion. "It's growing. It's strong. It's a huge part of the economy," Mr. Panetta said.

Read more at: <http://nyti.ms/2qh3KiB>



March 6, 2017

The City of Angels—and Life Sciences

By Marie Thibault

Los Angeles is best known for Hollywood, sunshine, and beaches. The city doesn't yet have a strong reputation as a home for the life sciences industry, despite its proximity to two locales known for such expertise—San Diego to its south and San Francisco further norther.

In reality, Los Angeles already has a sizeable number—around 300—of life science companies. Yet one big reason that Los Angeles isn't yet viewed as a hub for the industry is the city's sprawl, explained Dina Lozofsky, executive director of the Biocom Los Angeles office.

"It's just this huge geographic behemoth, but when you look at the number of companies, there are actually hundreds of life science companies in LA," Lozofsky said. "It's just that there's a few of them here and a few of them there and some in the south."

Read more at: <http://bit.ly/2mywvZn>

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BIOCOM ONCOLOGY DC FLYIN:

Biocom brought a group of seven California companies to Washington DC as part of our Oncology Advocacy Fly-In to learn about regulatory and legislative environments. Executives were given the opportunity to speak one-on-one with DC officials about new advances in cancer research, our California life science community, and the challenges they face to develop life-saving therapies and products.



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BIOCOM'S ONE YEAR ANNIVERSARY CELEBRATION IN LOS ANGELES:

One year ago, Biocom announced the opening of our office in Los Angeles with the aim of addressing the needs of life science companies in this Southern California region. Through the incredible support of partners in the area and collaboration with regional economic development groups, plus several tech transfer offices, our LA staff has made monumental strides in uniting the Los Angeles life science community. Thank you to our members who came to celebrate the One Year Anniversary of our LA office and the milestones we've made together!



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Biocom's 15 committees provide valuable networking, the chance to plan future Biocom events, and a forum to discuss critical issues within the industry. We are excited to announce the launch of committees in Los Angeles and the Bay Area for even more opportunities for our members to get involved with Biocom and the life science community. In this LifeLines, we are featuring the Facilities Committee and we hope to spark your interest in joining a committee where you can share your skills, knowledge, and expertise.



FACILITIES COMMITTEE

This central forum is dedicated to all facilities-related issues, including programming, design construction, facilities management, development codes, permitting, real estate trends, and financing opportunities. The committee also recommends positions on facilities-related bills to the Legislative Committee and Public Policy Oversight Committee to pursue Biocom-issued statements heard by elected officials.

Interested in joining? Contact Melanie Cohn at mcohn@biocom.org

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Name: Abegale Flores Colmenar

Job title: Director of Operations

Favorite movie: LaLa Land

Favorite book: Tuesdays with Morrie

Favorite quote: "It matters not what you were born as, but what you grow up to be" – Albus Dumbledore

Favorite TV show: Glee and The Flash

Favorite restaurant or meal: Breakfast

Favorite city: San Francisco

Favorite actor/actress: Robert De Niro and Anne Hathaway

Favorite thing to do on the weekends: Have breakfast in bed; take a nap cuddling with my baby girl

What CD can we find in your car: Maroon 5

Favorite hobby: Photography and scrapbooking

Favorite website: Wikipedia

Favorite spot in Southern California: Seaport Village

First job: Academic Advisor for middle schools

Favorite part of your job: Being around passionate people is what gets me up every day. I love helping my clients start their business and it's very inspiring for me learning about their exciting work.

If you could have another career, what would it be: A veterinarian

Why did you start working in your industry: Because I wanted to combine my interest in sciences with my love of working with people.

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Notogen, Inc.	Polaris Group	Samumed	Target Discovery	Verily Life Sciences
Novartis Pharmaceuticals	Polynoma	Samsara Sciences	TEGA Therapeutics	Vermdari
Novoron Bioscience	PolyPeptide Group	Sanguine Biosciences*	Tempo Therapeutics	Vertex Pharmaceuticals
Nowi	Poseida Therapeutics	Sanofi	Tenova Pharmaceuticals	Vet-Stem
Nucelis	PrimeGen Biotech	Scripps Laboratories	TerraVia Holdings, Inc.	ViaCyte
Nucleus Biologics	Primity Bio	Second Genome	Theravance	Vical
Nuredis	Primordial Genetics	Senomyx	Thesan Pharmaceuticals	Viking Therapeutics
Nurix	Principia Biopharma	Senté	Tizona Therapeutics	Viracta Therapeutics*
OBI Pharma USA	Prognosys Biosciences	Sentynl Therapeutic	TL Biolabs	Visionary Pharmaceuticals
Obsidio Therapeutics*	Provivi*	SeqOnce Biosciences*	Tocagen	Vital Therapies
Ocera Therapeutics	PvP Biologics	Seragon Pharmaceuticals	Tonbo Biosciences	Vitruvian Networks, Inc.
Ohr Pharmaceutical	QED Bioscience	Singlera Genomics	TP Therapeutics	Vividion Therapeutics
Omniox	QLSF Biotherapeutics*	Singular Bio*	Trace-Ability, Inc.	Wellspring Biosciences
Oncternal Therapeutics	Quay Pharmaceuticals Limited	SillaJen Biotherapeutics	Tracon Pharmaceuticals	Wildcat Discovery Technologies
Optimum Therapeutics	Regude Biotechnologies	Solstice Biologics	Tragara Pharmaceuticals	Xcell Biosciences
Orexigen Therapeutics	Regulus Therapeutics	Sophiris Bio	Trefoil Therapeutics	Xencor
Origami Therapeutics	REKA Health	Sorrento Therapeutics	Trethera Corporation	Yokogawa Electric
OrPro Therapeutics	Rempex Pharmaceuticals	SOVA Pharmaceuticals	Trianni*	Zavante Therapeutics
Otonomy	Renew BioIndustries*	Sparsha Pharma USA	Triphase Accelerator	Zosano Pharma
Oxford Bio Therapeutics	Renova Therapeutics	StemCells	Triton Health & Nutrition	
Pacira Pharmaceuticals	Repertoire Genesis	Stemedica Cell Technologies	Truvian Sciences, Inc.	
Pact Pharma*	Retro Virox	StemImmune	Twist Bioscience Corporation	
Patara Pharma	REVOLUTION Medicines	StemoniX	UCB	
Pathway Genomics	Ribomed Biotechnologies	StemProtein	Ultima Genomics*	
PersImmune	Riboscience*	Sunesis Pharmaceuticals	US Specialty Labs	
Pfenex	Ridgeline Engineering	Sun Genomics	Valtari Bio	

CRO/CMO

3DT Holdings	CalChem Synthesis	HD Biosciences	Norac	SG Scientific
Abbiotec	Cassia	IDEXX BioResearch	Oncolytics Biotech*	Shamir Insight, Inc.
ABL	Catalaize*	ImmunoActiva	Ora	Sherpa Clinical Packaging
Absorption Systems	Catalent	IMS Health	Pacific Rim Pathology	South Bay Biomics*
Accelagen	Cato Research	InClinica, Inc.	PharPoint Research	STA Pharmaceuticals
Accenture Accelerated RD	Cellecta	Integrium Clinical Research	PharmaDirections	Starfish Medical
Acurian	Champions Oncology	inVentiv Health Clinical	PharmaLegacy*	Stem Express*
Agility Clinical	Charles River Laboratories	IriSys	Pharmapace	SureClinical
Alkalest	ChemDiv	JadeBio	Pharmaron	SyneractHCR
Alphora Research*	ChemPartner	KaloBios Pharmaceuticals	Pharma Test Services	TCR Medical Corporation
Alliance Protein Laboratories	Cleave Biosciences	Lab Launch*	ProSciento	Therapeutics
A&M Biomedical	Crown Bioscience San Diego	Lincal USA*	Provivi*	Tioga Research
American Peptide Company	Cytelligen	Lovelace Biomedical	PSI CRO	Toxikon
AnaBios	Davos Chemical	Lucidant Polymers	Puracyp	Toyota Tsusho Corporation
Annova Chem	Diagnomics	Mediconomics	Qoolabs	Triligent International
Aptuit	Drug Delivery Experts	MedSource	QPS*	Uquifa, Inc.
Argonaut Manufacturing Services	eStudySite	MEIRxRS	Quadrants Scientific	Vala Sciences
Atheln	Exon BioSystems	MicroConstants	Quay Pharmaceuticals Limited*	Ventura Bio Center*
Bavarian Nordic	Explora BioLabs	MPI Research	Rapid Novor*	VIRAPUR
Behavioral Pharma	Genea Biocells	My Chem LLC	ReoLab*	Wax-It Histology Services
BioAuxilium Research	Global Blood Therapeutics	Naeja Pharmaceutical	Reveal Biosciences	Zensun USA
BioBlocks	Grand River Aseptic Manufacturing	Nanosyn*	Rho	Zyagen
Bioclinova	Greenwich Biosciences	Neox USA*	Robarts Clinical Trials	
Bio-Edge	Hamamatsu Pharma Research	Neuropore Therapies	RxGen	
	Hamari Chemical San Diego Research Center	Neuroservice	SD Chem*	
		Neuro-Sys	SeqOnce Biosciences*	

MEDICAL DEVICE & DIAGNOSTIC

Acon Laboratories
Adagio Medical
Aethlon Medical
Alpha-Tec Systems
AltheadX
Amydis Diagnostics
Aptitude Medical Systems
Applied Proteomics
Astute Medical
AVACEN Medical*
Awesome Medical Company
Axonics Modulation Technologies
Banyan Biomarkers
Berkley Lights
BillionToOne
Biocept
BioDx
BioFluidica
Biological Dynamics
Biomerica
Biospacific
bioTheranostics
Bio Trace Medical
BlueNovo Biosystems, Inc.

Breathe Technologies
Bruin Biometrics
Burl Concepts
Canary Health
Cell Idx
CeloNova BioSciences
Ceterix
ChromaCode
Clarify Medical
Click Diagnostics
Cliniqa Corporation
CombiMatrix
Compellon
Confirm Biosciences
CTK Biotech
CVAC Systems
Cytori Therapeutics
DCN Diagnostics
DermTech International
DexCom
Diadexus
Dorsa Vi USA
DNA Electronics*
Elixir Medical Corporation
Ellipse Technologies
Emerge Diagnostics
Endologix
Entra Health
Epic Sciences

Epitope Diagnostics
Fallbrook Engineering
FP Complete
Fresca Medical*
GenomeDx Biosciences
GenWay Biotech
GIMDx
Glaukos Corporation
Glysens
Harbor Med Tech*
Heart Metabolics USA
Hitachi Chemical Research Center
Ichor Medical Systems
Ignyta
Imagion Biosystems
ImpediMed
ImThera Medical
Inari Medical
Inceptus Medical
INOVA Diagnostics
Interpreta
Interventional Spine
Invivoscribe Technologies
Ionian Technologies
Ivantis
KfX Medical
Kurin
Luminex Corporation
Lumira

MARDX Diagnostics
Mass Spec Lab
Medipacs
Micell Technologies
Millennium Health
Minerva Surgical
Namiki Precision of California
Nano Imaging Services
Nanomedical Diagnostics
Neurvana Medical
NucleusHealth
NuFACE
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OncoSec Medical
Oncotracker
Organovo
Patient Safe Solutions
Precision Diagnostics
Profusa
Prometheus Laboratories
Pulse Biosciences
Q-Bridge Solar
Qico
QT Medical
Quidel
Quinn Medical
Rebound Therapeutics
ReCor Medical
Renew Medical

ReShape Medical
REVA Medical
ReVision Optics
Roka Bioscience
SeaSpine Orthopedics
Sequenom
Sienna Labs
Signal Genetics
Simplify Medical
Sirigen
Solekai Systems
Sonendo
Specific Technologies
SpectraScience
Spinal Elements
Suneva Medical
Sysmex America
Tandem Diabetes
Terumo Cardiovascular Systems Corporation
Tokai Medical Products
Transcend Medical
Tristan Technologies
Trovagene
Vention Medical
Xtant Medical

NON-PROFIT

American Cancer Society, Border Sierra Region
Biomedical Manufacturing Network*
Calibr
California Baptist University, College of Engineering
California State University, San Marcos
Chan Zuckerberg Biohub*
Cedars-Sinai Medical Center Office of Tech Transfer
Children's Hospital LA*
CIRM
City Of Murietta
CONNECT
Consulate of Canada
CSU, CSUPERB Program
CSU, Los Angeles
Drugs & Diagnostics Tropical Diseases
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Human BioMolecular Research Institute
Huntington Medical Research Center*
IDA Ireland
Institute of Engineering in Medicine

Institute of Myeloma & Bone Cancer Research
Institute of Quantitative Systems Pharmacology (IQSP)*
ISM San Diego
J. Craig Venter Institute
Kaiser Permanente
La Jolla Bioengineering Institute
La Jolla Institute for Allergy & Immunology
Lawrence Family Jewish Community Center
Life Science Innovation Network Japan
Los Angeles Biomedical Research Institute
Los Angeles EDC
Lowy Medical Research Institute
MiraCosta College Biotech Program
Molecular Medicine Research Institute
Mt. San Jacinto College
PhRMA
Point Loma Nazarene University
PRISM
Rady School of Management, UCSD
Salk Institute for Biological Studies
San Diego Biomedical Research Institute

San Diego Blood Bank
San Diego Clinical and Translational Research Institute, UCSD
San Diego Community College District
San Diego County Water Authority
San Diego Employers Association
San Diego Regional Chamber of Commerce
San Diego Regional Economic Development Corp.
San Diego Supercomputer Center (UCSD)
San Diego Workforce Partnership
Sanford Burnham Prebys Medical Discovery Institute
Scottish Development International
Scripps Health
Scripps Institution of Oceanography*
Scripps Research Institute
SDSU, Graduate & Research Affairs
Society for Brain Mapping & Therapeutics
SRI International*
Torrey Pines Institute for Molecular Studies
UCLA Office of Intellectual Property
UCLA School of Medicine
UC San Diego Health
UC San Diego Extension

UC San Diego Office of Innovation & Commercialization
UCI's Office of Research
UCSD, Department of Bioengineering
UCSD, Office of Advancement
UK Department for International Trade
University of San Diego
USC Stevens Center for Innovation
Western University of Health Services
Zhuhai Commercial Service, North America*

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Azzur Group
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Bionest Partners
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Biotechnical Services
BioTix
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Management

* New Members from February 2017 to May 2017

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