IADR Innovation in Oral Care Awards

Interviews with previous winners to mark 15 years since the award supported by GSK was started.

Letter on behalf of IADR Presidents (2004-2018) and the IADR Innovation in Oral Care Awards Committee (2004-2018).

For the past 15 years IADR has proudly partnered with GlaxoSmithKline Consumer Healthcare (GSK) in sponsoring the IADR Innovation in Oral Care Awards. The intent of the awards is to help investigators pursue innovative and novel research in oral care, above and beyond the bounds of traditional dental research. These awards provide opportunities for investigators to conduct oral health research that will have a direct impact on the oral health of the public.

Since 2004, GlaxoSmithKline Consumer Healthcare has generously contributed over $3 million USD to IADR to fund 46 recipients of the IADR Innovation in Oral Care Awards.

The prestige of the IADR Innovation in Oral Care Award was established early and continues to grow. This success could not have occurred without a review committee of IADR members who have participated in the program.

The IADR Presidents and IADR Innovation in Oral Care Awards Committee Chairs, current, past and present thank GSK for 15 years of generously supporting the awards, the awards committee members who volunteered their time in reviewing the applications and all of the IADR members who have submitted such high-quality applications and make the committee's job very difficult over the years. Our partnership with GSK has been invaluable and we hope to continue this partnership for many years to come with the ultimate goal of improving oral health worldwide.

IADR Presidents 2004-2018

Stephen Challacombe (2003-04), Paul Robertson (2004-05), Takayuki Kuroda (2005-06), Stephen C. Bayne (2006-07), Deborah Greenspan (2007-08), J.M. Ten Cate (2008-09), David M. Williams (2009-10), Maria Fidela De Lima Navarro (2010-11), E. Dianne Rekow (2011-12), Mary Macdougall (2012-13), Helen Whelton (2013-14), Yoshimitsu Abiko (2014-15), Marc Heft (2015-16), Jukka Meurman (2016-17), Angus W G Walls (2017-18), Rena D'Souza (2018-19).

IADR Innovation in Oral Care Awards Committee Chairs (2004-2018)

John Greenspan (2004), John Stamm (2005-07), Mariano Sanz (2008-09), Lakshman Samaranayake (2010-11), Johann DeVries (2012), Alvaro Della Bona (2013), Mary Walker (2014), Michel Goldberg (2015), Margherita Fontana (2016), David Herrera (2017), Deepak Saxena (2018), Cinthia Tabchoury (2019).

IADR

International Association for Dental Research

Introduction from

Teresa Layer

Vice-President, Oral Health Category Research and Development, GSK

2018 sees the 15th year of the IADR Innovation in Oral Care Award supported by GSK. To mark this important milestone, we've interviewed some of the previous winners of our award. Through the pages of this booklet they've shared their stories to inspire future award applicants and those considering a career in oral health research.

GSK is a science-led, global healthcare company with a purpose: to help people do more, feel better and live longer. We have three global businesses that research, develop and manufacture innovative pharmaceutical medicines, vaccines and consumer healthcare products. Our goal is to be one of the world's most innovative, best performing and trusted healthcare companies.

Innovation is critical to what we do as a business and we know that some of the best innovation can come through external collaboration. The IADR Innovation Award supported by GSK is designed to support researchers to develop innovative technologies and research which enhance oral health and quality of life.

GSK is proud to partner with the IADR in recognising the knowledge and dedication of applicants to advance oral health research. I'd like to thank all entrants to this award over the years for their dedication and passion and I hope that this award will continue to inspire scientists and clinicians into the future, driving innovation in oral health.

Dr. Teresa Layer
Vice-President, Oral Health and Skin Health Category Research and Development GSK

Jack L Ferracane

PhD, Professor and Chair, Oregon Health & Science University and Science University, School of Dentistry, Restorative Dentistry.

In this interview with Kavita Sud from GSK Oral Health, Jack shares his experience of winning the 2004 GSK IADR Innovation in Oral Care award and his career journey so far.

Can you give us some insight into your career journey up to now?

I came out of a biomaterials programme at Northwestern University in Chicago and I've always been involved in looking at dental materials, their structure, their function, and their clinical performance. Now we're trying to study different molecules to be used in dental composites, to make them more resistant to degradation and longer lasting. And to also make them more resistant to bacteria and bacterial enzymes.

I originally had an interest in going into dentistry, but I changed my mind when I got interested in biomedical engineering. So, I did a Bachelor's degree at the University of Illinois, and then I went to Northwestern for my graduate training, and that was in biomaterials.

I got very interested in biomaterials, and specifically, initially, biomaterials used as bone cements for orthopaedics. Then I transitioned into polymer materials for dental composites. And that's where I really made my career for quite a number of years, looking at trying to understand why composites don't perform the way they might clinically. Also, I have for years been doing practice-based dental research, where we have clinicians doing research in their practices, collecting data under the normal daily practice conditions to share with other dentists.

"I do want to thank GSK for starting this programme, and then for continuing to support it over the years."

Tell me about your research project for the GSK IADR Innovation in Oral Care Award?

I was lucky enough to win one of the first iterations of the GSK sponsored Innovation in Oral Care Award. I was working with a colleague of mine, John Mitchell, on bioactive glasses. The concept was to try to develop a product that could be sold over the counter, and ours was to use bioactive glass in a desensitising agent for dentine hypersensitivity. The aim was that it would desensitise but the other aspect of bioactive glasses is that they release calcium and phosphate, and could potentially help remineralise the demineralised surface that was causing the sensitivity. So, for us, it was a big deal, a first foray into something that could be developed into a product and had potential to be marketable.

"So, for us, it was a big deal, a first foray into something that could be developed into a product and had potential to be marketable."

What did winning the award mean for you professionally and personally?

Well, I think it was a little bit of a twist for us, because I hadn't really been involved in trying to develop a product, or come up with new product ideas before. So, I was mainly looking at materials that existed, and trying to better understand them. And so, this was an opportunity to actually step into that realm, where we, kind of, knew that's the direction we were heading right from the start. So, that was a great opportunity. We now had the opportunity to work with companies like GSK and share ideas about product developments.

I do want to thank GSK for starting this programme, and then for continuing to support it over the years. I think it's been great. People are always trying to find revenue sources to fund their ideas, and it's difficult. All over the world, money is tight, and we're always battling. But for GSK to have done this, and to continue to do this for so many years, I think we all really appreciate it. Thank you very much.

And what advice would you give to others, who are considering applying for the award?

My advice to award entrants would be to be creative but also practical. The thing that was of interest was the application of materials directly into an over the counter product. This meant it had to be something people would want to buy and use and needed to be genuinely useful for dental professionals and patients. And we had to think about our science in a different way. So, I would suggest to people that they think about that. Think about things that are going to be useful for people, and easy to use by dental practitioners. It's got to be creative.

A lot of us researchers were not trained to be entrepreneurial – it's an interesting way of thinking. It is less about looking at the science of materials for science sake but trying to develop something useful. I enjoy taking this approach.

What advice would you have for young Dentists, who are thinking about getting into research?

If you want to be in research focus on up and coming subjects. Make sure

Winner of the 2004 GSK IADR Innovation in Oral Care Award

Novel Dental Desensitizing Agent Based on a Biomimetic Approach

you focus but don't limit yourself too much. Work with what you know but always keep your eyes open – you never know where a collaboration may take you for example. And never give up – you just can't!

"A lot of us researchers were not trained to be entrepreneurial – it's an interesting way of thinking. It is less about looking at the science of materials for science sake but trying to develop something useful. I enjoy taking this approach. "

What does the future hold for you?

I am at a point now where a lot of what I do is called faculty development and mentoring. I stay involved in research and I am focused on making the faculty that I have helped to recruit successful teachers. And also ensure that they work and play well with others.

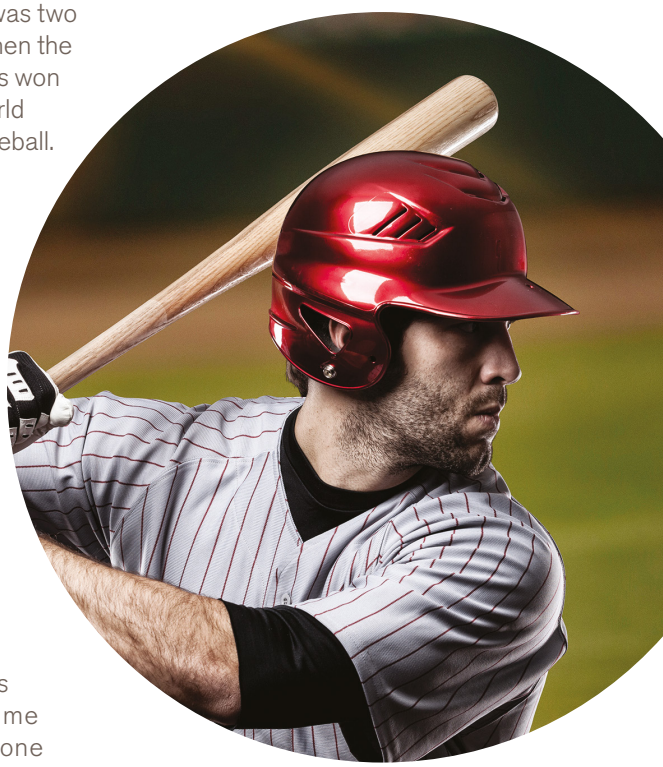
A number of years ago, I got interested in microbiology. It is not something I ever did any work in, but now we are trying to build up a group who are trying to study the microbiome and its interaction with tooth surfaces, and more specifically, dental materials. We seek to understand how we could design new materials that would better coexist with oral bacteria and not be negatively affected by them and instead inhibit their virulence.

I will also continue to be involved with a study across the US with over 200 dental offices and nearly 3,000 patients with cracks in their teeth. We are hoping to develop a simple diagnostic tool that dentists can use to predict what is going to happen to a tooth with a crack in it.

"One of the highlights of my life was seeing the Chicago Cubs win the world series of baseball in 2016. I waited almost 60 years for that moment!"

Can you tell us something about yourself that is not on your resume?

The highlights of my life are my wife, Tricia, and my three sons, who are now grown, and two of them married. But probably the biggest highlight of my life, aside from my family and friends, was two years ago, when the Chicago Cubs won the 2016 World Series of baseball. So, I grew up in Chicago. I'm a big Chicago sports fan. And I waited almost 60 years for the Chicago Cubs to win the world series. I thought it would never happen, and when it happened, I think that was pretty exciting.



What is your favourite piece of music?

That's a tough question for anybody! I thought about it in terms of what, sort of, inspires me, and what I hear that gets me emotional, if you will. And so, one of the things that's really important to me is my faith, and one of the songs that I really enjoy is called "Your Grace is Enough" by Matt Maher. He produced that in about 2003, and it's just a great song, because to me, it tells the whole story.

John Featherstone

Dean and Professor, School of Dentistry
UCSF School of Dentistry Preventative & Restorative Dental Sciences

Having recently retired from the University of California, John reflects on his career and shares his wisdom on the skills needed to be a success in oral health research with Kavita Sud and Jonathon Creeth from GSK, Oral Health.

Can you tell us a bit about what you do and where you are from John?

I have been a Professor or some level of Professor in the dental world for over 44 years. I retired from the University of California in December 2017, having been the Dean there for over 10 years. I was born in New Zealand and have lived in the US now for 38 years.

At the moment I am continuing to keep my fingers in a lot of pies. I'm consulting for a couple of companies, and most importantly continuing work with my collaborators, who are now running the laboratory in the clinical research arena. I continue to be a collaborator; I have collaboration also going on in other parts of the world and I'm doing a lot of finishing up of some writing.

"When writing an application write for your audience – make it informative and interesting"

I'm also doing some Continuing Education courses; all day courses on caries management. I will be presenting at the International Association for Dental Research meeting in London in July. I'm the head of the programme committee, for a meeting of the American Academy of Cariology in August of this year. I will be going to Egypt and Israel in November of this year, also to give presentations.

Can you give us some background to your career development?

I first got into the world of dentistry by accident. I was living in England at the time and decided to go back to University, and I completed Master of Science at University of Manchester in Physical Chemistry. I wrote back to one of my old Professors in New Zealand and said, "I'm thinking of doing a PhD, what are the opportunities there?" I was already offered a place in Manchester and he suggested research into dental caries and I said, "what the heck is that?" And he said, "that's tooth decay." I said, "that sounds interesting."

After several years in New Zealand I moved to the US, to Eastman Dental Center in Rochester, New York, where I was for 15 years. I became the chair of the Department of Oral Sciences there. My research morphed from being pretty basic bench research into all aspects of dental caries, microbiology, chemistry, biochemistry, salivary chemistry, calcium phosphate, and into public health and community dentistry, in terms of how to deal with caries. And that morphed into running clinical trials, even as a non-clinician, and eventually morphed into big efforts over the last 20 years on caries management and caries risk assessment.

And parallel to that, I started doing some research with lasers in 1980, which was way before almost anybody had conceived of using lasers in dentistry. And we worked with numerous laser conditions and worked out how lasers interacted with the hard tissues of the mouth; enamel and dentine and so on. And that led eventually, to commercialisation of the product in the US, which is now well across the US and will be spreading worldwide before very long.

What advice would you give to other dental professionals or scientists considering entering oral health research now?

I would advise people that it helps to be both a scientist and a clinician. But having said that, I've been an opportunist all my life and really it's a matter of keeping one's eyes open. And if young people, or older people for that matter, are going to get into the world of science, particularly the world of dental science, they've got to keep their eyes open. They've got to be very open-minded and prepared to go in different directions.

No matter what, you have to follow your passion, because if you're going to follow the world of science rather than the world of a clinician, you're not going to be paid as much. You're going to have to be prepared to have a different life, and for your life to be driven by your passion and your work and your drive and your results, and your teaching and seeing all of your students having success; that's what drives you.

What did it mean to you personally and professionally to win the IADR GSK Innovation in Oral Care Award?

Professionally, winning the award was important as it meant we had enough money to do some innovative work which we couldn't get funded elsewhere. And for years, I will say that some of the best work that my people have ever done, was funded by shall we say, overflow money to some extent.

And this GSK award; that was a critical piece, because it cost a lot more money to do that than it did to do our relatively simple lab work. And the other key thing that it really did was to solidify Ling Zhan as a collaborator and to set her up with a laboratory, so that she didn't go back to China. She's still there now having taken over running

Winner of the 2005 GSK IADR Innovation in Oral Care Award

A Novel Antibacterial Approach to Reduce Caries in Children

my lab now I've retired. So it had many more ramifications than one might think.

The huge advantage of the GSK IADR Innovation Award is that it's big enough to actually do something substantial and set up for the future. We could never have done what we did if it wasn't for that award, because we weren't advanced enough to go for a National Institutes of Health award. We couldn't have done it without the money, because we needed to pay for lab costs and clinical costs and all of that. And it really set up a very strong microbiological part of the eventual caries management work that we put together.

"I've been an opportunist all my life and really it's a matter of keeping one's eyes open"

John do you have advice for researchers looking to apply for awards such as the GSK IADR Innovation Oral Care Award?

If someone is considering entering an award such as that they need to understand that their idea has to be sold to an audience that wants to buy it. When writing an application write for your audience – make it informative and interesting. Remember the reviewer is likely to be busy and have other demands on their time. It has to be clear enough, concise enough, to capture the imagination of the reviewers, no matter what the topic. So it's almost a literary activity rather than a scientific activity.

So what does the future hold for you?

The future holds all sorts of exciting things. So part of it is continuing in the world of dentistry and continuing to do Continuing Education courses. And also, to continue as a collaborator and help to write up work that's been done, and some of it's been sitting there for years. There's no way I'll ever write up everything that we ever did.

But my future, in other directions; I used to be a musician, played the piano and a vocalist and I've started doing some of that again, started getting back up to speed. In the time I was Dean I hardly played the piano at all and I'm getting back up to speed on that and playing occasionally with a group. And that's one thing that I want to do. A couple of members of my family are also musicians, so we'll be playing a little more together.

I love the outdoors, and as long as I'm strong enough and fit enough I will be pursuing outdoor activities; skiing and hiking and boating. I have downsized my accommodation, so I have a much smaller house in the San Francisco area that I can go away and leave for weeks with no problem. I'm spending more time with the grandkids. I've also got a daughter in England, a son in Florida and one in San Francisco; so, I'm spending more time with them.

"No matter what, you have to follow your passion"

Do you have a favourite piece of music or a song that you can share? And tell us why?

I have lots of favourite pieces of music, but let me pull out two in particular. My very favourite song is "Imagine" by John Lennon. And why? Because he was imagining a world which unfortunately I don't think will ever exist. Imagine all the people, sharing all the world and all the other things in "Imagine". And I've actually sung "Imagine" in several venues around the world, including walking into a bar here with a vocalist in New York where I am right now, and singing "Imagine" there.

It's a very deep song for me. It touches my heart and I think it touches a lot of people's hearts. And when we think of all the terrorism and the nonsense and the conflict between people, which by the way has been going on since people walked the earth; that's a very critical piece of music and a song for me.

And the second one. I love grandiose music and my favourite composer is Beethoven. My very favourite piece is Beethoven's Ninth Symphony, which is amazing and has Ode to Joy in it, Choral symphony. And I love it for two major reasons; one is that it is such grand scale with organ music, with the orchestra, with choral, with everything. And way back when in my life I used to play the organ, so that's probably my favourite instrument.

But what's even more amazing is that Beethoven was stone deaf, totally deaf, when he wrote that. And how anybody could ever write it, let alone when they're deaf; I have no idea.

Is there anything you would like to add?

One thing I'd like to share is that I take my hat off to GSK for making the bold move, was it 15 years ago, to start the innovative award. And I really take my hat off to the company for continuing this award. But more importantly, from the point of view of shall we say, letting people do innovative work that they couldn't have otherwise done. And I wish other companies would come in and do the same thing. So thank you.

Peter Holbrook

Faculty of Odontology, University of Iceland

Professor Peter Holbrook began his career in dentistry in Edinburgh but soon expanded his interests to microbiology ahead of moving to Iceland. He now balances research work with clinic time helping him retain direct interaction with patients which forms a base for his medicines development. In this interview with Mhari Coxon and Steve Mason from GSK, Oral Health. Peter discusses his career and the benefits of collaboration with other faculties.

Would you like to start by introducing yourself?

My name's Peter Holbrook, well my first name is William, so I always write my name as W. Peter Holbrook. I was born in Warrington in the UK, and I immigrated to Iceland in 1981.

And why don't you use the name William, Peter, is that because your father was William, or just you like Peter?

Family discussions. My grandfather wanted to have a name of William, and he christened his son William Stanley, and he always used Stanley, so then I became William Peter, and always used Peter. So, it's a bit of a family joke! I need an Icelandic name as well, when I came here, for an Icelandic passport and so on, so we 'Icelandicised' the William to Vilhjalmer.

"The GSK IADR Award enables the links between the clinical needs and the chemical possibilities"

Can you tell us your current job title and a bit about your career to date?

I am Professor in the Faculty of Odontology in the University of Iceland but also run an oral medicine clinic for the national hospital and another one that is my private practice half a day per week. As well as Odontology I am also a specialist in both Oral Microbiology and Oral Medicine. It's a very interesting job because I'm closely linked with drug developments and they can be used for some of the patients I see.

I qualified in dentistry in Edinburgh in 1972, and after a year in the dental school moved to the medical school, to the microbiology department. I then began a PhD looking at anaerobic bacteria, which at that time was very interesting. It had been linked to, for example, periodontal disease as well as general infections in the body. There was a lot of interesting research being done in the periodontal area, and my PhD was on growing and identifying these anaerobic bacteria.

After finishing my PhD, I moved to Manchester University Dental School for a short time to undertake clinical work in order to get my fellowship, which was the clinical specialty, and was very necessary. And then I moved back to Edinburgh to complete my training in microbiology, which is the MRCPath, membership of the Royal College of Pathologists in oral microbiology.

My wife is from Iceland and in 1981 we moved there and have been living there ever since. I started as a lecturer in the dental school, and then was promoted, did quite a bit of work, became a Professor and added the oral medicine specialty to my clinical work. The dental school is quite small here but has a lot of interesting areas for research and I try to be as active as I can. We often collaborate with colleagues from different areas which is very stimulating. One of the areas of collaboration I developed was with the faculty of pharmacy or pharmacology. The link between the oral cavity and the rest of the body is now firmly established and this is being taught in the school of health sciences as we now classify it.

"My advice to dental professionals or scientists considering oral health research would be to consider collaboration with commercial companies"

Thinking back to the GSK IADR Innovation in Oral Care Award, would you like to tell us what it meant to you professionally and personally to win that award?

Well, it was very important. First of all, to get money from abroad and bring it in here gave me a lot of recognition. So, the money itself was very useful. As we had developed our group between pharmacy and dentistry, and we were wanting to develop new drugs to treat some of the conditions that I was seeing in the patients.

Then having got this money from abroad, it raised the view of our research, so we were able to get money here, and some funding developed that could be more linked to commercial-linked research and so on. The award winners were a mixed group of a biologist, two pharmacologists and myself. So, it's allowed us to work together between three faculties of the university. And it's very interesting. We have been recognised as a cross faculty research team ever since.

And of course, later on, I got an IADR Award of Recognition as a distinguished scientist award, that was just for myself, That was 2015, ten years after I got the Glaxo award. And

Winner of the 2005 GSK IADR Innovation in Oral Care Award

A Novel Treatment for Cold Sores

I'm now actually going onto one of the IADR committees, so I am still being used in that area and here as well. I have been on the research council here in Iceland, so it has been very interesting.

In regard to the GSK IADR Innovation in Oral Care Award, and scientific awards like this, what is your advice to researchers to help create a successful application?

Well, certainly, they need to have a very clear view of the future of their study, and they can't necessarily go all the way themselves with the funding that is available, but they should be able to see the long-term future, and then put that together to make an application. That's what I did, and it worked.

And also, if they linked up to some of their clinical knowledge, which may be more specialised after a few years from graduation, then this works out very well. The GSK award is almost unique, in this respect, within the IADR. There are others. Dental materials areas will certainly be something very similar where students and young graduates will see the links between the clinical needs and the chemical possibilities, so, it's very interesting to link up the clinical side and the laboratory side to research and getting funding for that is excellent.

When you reflect on your career, what were some of the key moments that helped drive your success?

Well, certainly this collaboration, both the funding from Glaxo, and the funding that we developed here and the collaboration between faculties… this was very stimulating. We have been able to work to develop solutions for the patients that we see directly. For example, we undertook some work with denture wearers in homes for the elderly and candida infections were common. We used monocaprin, an anti-candidal agent, which we put into a gel. We saw candida counts reduce, inflammation reduce and patients able to eat and talk with their dentures in place.

What advice would you give to other dental professionals and scientists considering entering the field of oral health research?

The collaboration between academics and commercial companies is certainly helpful in moving this forward. Because you can't fund it all from general research funds. I am very keen to encourage my young graduating students to consider specialist training.

"I am very keen to encourage my young graduating students to consider specialist training."

I wonder if you could tell me what do you see the future holding for you?

I am due to retire in a year's time and I expect, as Reykjavik is a relatively small community, I will maintain links with the university if needed. I think that local drug development research could continue. I would certainly like to see the commercial development coming along and it may be that I extend my licence slightly in order to do a little bit of clinical work if there are products for testing.

Peter, perhaps you could tell us something about yourself that might not appear on your professional resume?

People might not know that I have a country cottage that my wife and I go to almost every weekend.

In the winter we have a hot pool that we use to heat the house and it's lovely to sit in it and watch the Northern Lights.

In the Spring and Summer we also have a large vegetable garden where we grow lots of different vegetables. And this really is the advantage of living in the countryside; its possible to escape the academic work and think about something else. It's a delightful place and I will be enjoying the countryside here in Iceland more once I have retired.

And one final question Peter – what is your favourite type of music?

I'm very interested in classical music and my wife and I regularly go to concerts and recitals. Near our cottage there is a cathedral where there are music recitals in the summer.

We are both very interested in music from the Baroque time through to modern music. But I don't sing, I just listen!

Gordon Ramage

Professor Associate Academic,
Institute of Infection Immunity and
Inflammation, Glasgow Dental School

Gordon Ramage is no stranger to international research. Having studied his undergraduate degree in Edinburgh and his PhD in Belfast he then moved to San Antonio Texas and on to Calgary before returning to Glasgow where he is a Professor. In this interview with Kavita Sud and Roshan Varghese from GSK, Oral Health. He shares his career journey, his love of mycology and his dedication to the study of candida along with some advice for future researchers.

Can you tell us about your career to date?

I did my undergraduate degree at University of Edinburgh and then I went to Queens University of Belfast and I did a PhD on prosthetic joint infection. There I became interested in biofilm infections and that led me to go to the University of Texas Health Science Centre in San Antonio and that's where I had an interest in dental candida infections, as well as catheter infections. From there I moved north to Calgary where I continued to work in biofilms, working on cystic fibrosis. That gave me the opportunity to move to the university back in Glasgow, so that was Glasgow Caledonian University where I had a lectureship for three years. I moved after three years as a senior lecturer to Glasgow Dental School and since then I've received a personal chair in microbiology and, as I said, I continue to lead the oral sciences research group working primarily on complex biofilm infections.

"Pick an area, stick in it, develop your ideas, develop relationships"

I believe a good researcher needs a good clinician to work with in order to advance things. That's my key advice and that's why I've been successful – by finding a good clinician to work with. It's about a partnership.

What do you think are the key moments that stand out as contributing to where you are today?

My decision to pack my bags and go to America was the best thing I ever did. When I moved from Queens University of Belfast to the University of Texas Health Science Centre, I switched my discipline quite dramatically in terms of working from bacteria to then working with yeast. I was completely unfamiliar with fungal biology, but unbeknown to me that was a centre of excellence for mycology and fungal infections. Very few people had been working within fungal biofilms, and so that gave me the opportunity to publish lots of papers very rapidly. Within those two years of being in San Antonio I had over ten peer reviewed manuscripts and I won the Outstanding Postdoctoral Researcher at University of Texas Health Science Centre. So critically my time in San Antonio gave me the backing to work with candida biofilms and everything I've done subsequently, even working in cystic fibrosis biofilm, wind biofilms and what I do mostly now is oral biofilms, then candida is still a central theme.

"The award provides an amount of money that allows you to develop independence"

Mycology as a discipline is underappreciated, both by the public and by academics. I've worked with candida for 18 years now, so I gravitate back to it. My mission, if you like, is to try and spread the word of candida and try and give it as pivotal importance in oral microbiology as streptococcus mutans, porphyromonas gingivalis.

Based on your career what advice would you have for other folks who are venturing into dental research academia?

My main piece of advice would be to focus – don't try and do everything. I think we don't really appreciate how wide dentistry is and oral science. There's many different facets to it. Pick an area, stick in it, develop your ideas, develop relationships. And don't be swayed to go into another area just because maybe the funding is more attractive. I think if you continue and develop a particular area, your time will come.

My advice for young scientists and clinicians would be don't put people on a pedestal. I think there's a tendency for you to look at the big names in a particular research field and think they're gods. They're not gods, they're just human. And they might have papers and big impact papers, but they've worked hard to get there. It doesn't mean they're brilliant, so don't be in awe and don't do something because somebody said not to.

What did it mean to you to win the GSK IADR Innovation in Oral Care Award, both from a personal as well as from a professional point of view?

I received the award just as I started my position at Glasgow Dental School. So within a month of starting, I had a really useful starting point to kick-start my career, and actually that grant paid for a first piece of research. So that really kick-started a lot of the research that we have done looking at candida biofilms, and subsequently complex biofilms, to try and understand how we can in some way improve the ways in which we treat oral infections.

Winner of the 2007 GSK IADR Innovation in Oral Care Award

Improving oral care using Tea Tree oil and its derivatives

From a personal standpoint that gave me the ability to have further networks within the dental community. Prior to moving to Glasgow Dental School I really didn't have any background in oral microbiology other than the work I'd done in candida, so it gave me an opportunity to integrate with the BSODR and the oral microbiology immunology group, the OMIG, and from that that's developed relationships with Cardiff, Sheffield and Newcastle. Those networks are still going today and more importantly it gave me the opportunity to actually work with GSK.

"My mission, if you like, is to try and spread the word of candida and try and give it pivotal importance in oral microbiology"

What is your advice to other researchers who are potentially thinking of applying for the GSK IADR Innovation in Oral Care Award?

The award is an excellent opportunity as it provides an amount of money that allows you to develop independence. All research funding is good funding. Don't be worried about the commercial perspective on it. Speak to people who have won the award. Speak to those who have been unsuccessful. It at the very least allows you to develop your ideas and develop that focus.

Since receiving the award in 2007 it has given me the stability and resource to push on and work with other schools and departments.

What does the future hold for you?

I would hope over the next five to ten years that I can continue to develop my growing expertise within oral microbiology. I'm very, very interested in how bacteria and fungi interact and how that impacts caries and periodontal disease and denture related disease.

My main goals going into the very near academic future are to try and understand those interactions and how we can better manage them. Long-term I've perhaps got commercial interests. I enjoy working with industry

I really don't know what the future holds. I just don't want to be a sole academic the rest of my life. I'm interested in doing other things, whether it's consulting, whether it's developing ideas, working in public engagement, working with schools to try and understand and develop ways we can work and tell younger people about oral health and how it's impactful in terms of systemic health. Lots of things to do.

Can you tell us something about yourself that isn't on your professional resume?

Well, as a youngster before university I used to play with some professional football clubs, so I was a pretty good football player or soccer player.

I have also been an official photographer at the Austin South by Southwest music festival and I've interviewed Elbow and Ash and taken photographs which are published.

Can you tell us your favourite song?

Probably pretty much anything from the Proclaimers. My favourite song is probably Sunshine on Leith because of my association with Hibernian Football Club; it makes the hairs on your back stand up. And I also like the song which I can't remember now. Yes, pretty much anything by the Proclaimers. One of our first songs at my wedding was a Proclaimers song.

Rena D'Souza

Professor Dentistry, Schools of Dentistry and Medicine, University of Utah.
President Elect for the IADR

In her role as President Elect of the IADR Rena D'Souza is committed to helping the organisation build up to its centennial celebrations in 2020 while planning for the next century of success in dental, oral and craniofacial research. She is working on a number of projects designed to empower women and early career investigators in research roles across the globe. In this interview with Mhari Coxon and Steve Mason from GSK, Oral Health, we hear from Rena about her journey to her current position and her aspirations for the future.

Rena could you tell us current position?

I am a tenured Professor of Dentistry here at the University of Utah. I also hold two administrative titles of Assistant Vice President for the Health Sciences and Associate Vice Provost for Research which is a campus-wide role. Probably my proudest title, and a great honour and privilege is the position of President Elect of the International Association for Dental Research (IADR).

Can you give us some background to your career to date?

My career to date has been fun; an adventure. I received my Bachelor of Dental Surgery at the University of Bombay and then I migrated as a postdoctoral fellow at Columbia University , New York. After a year, I followed my heart to Texas, because my, at that time, Richard, my future husband was based there. I moved there to start my academic career. I received my Masters and PhD and then felt it was necessary to go back to dental school to get the American DDS.

I was raising my two young children while studying and whilst it was a wonderfully productive time of my life it was hectic! After that, I think my career has been balanced with my passions for discovery and for giving back in the forms of mentoring. I can't really prioritise one over the other, so whilst I pursued knowledge, and hoped to advance its frontiers of knowledge, it mattered to me to make connections to the outside world. And AADR and IADR, for that reason, served as those wonderful windows to the outside world as I built my career.

I felt, throughout, that as important as it was to be seeking large, major grants from the NIH, it was just as important to be responsible about training the new, or the next pipeline of researchers for dentistry. I truly have a passion for both, and I think my career is marked by these two commitments I've had.

When you get to a point when the success of others means far more than your own success, you realise you do have to step up to the plate. I took on the chairmanship of the Department of Biomedical Sciences at Baylor – it was a large department of about 100 people – giving me the chance to experience leadership and administration. And I must say I loved that.

I liked watching individuals grow, building programmes, encouraging women and minorities to succeed. All of that gave me a lot of satisfaction, and set me up for a Deanship, which is what brought me to Utah. My job was to launch a new school of dentistry at the University of Utah, and they'd never had one before in the state.

"Winning the GSK IADR Innovation in Oral Care Award is truly an experience that I cherish deeply"

It was a wonderful experience of challenges and successes. And as soon as that was launched, I took on administrative responsibilities that went beyond the Deanship. So, my career has been a combination of intense, exciting research and my true love and passion that has not, in any way, been muted to really train that next generation and to serve as a role model for women in dental research. And now that has led me, I think, to probably one of the most gratifying privileges of my professional lifetime, which is to be president of a global organisation, like IADR. So, it's been a lot of fun.

Thinking back to the GSK IADR Innovation in Oral Care Award, what did it mean to you, professionally and personally, to win the award?

Winning the award is truly an experience that I cherish deeply. We focused on development and genetics – we had helped discover the gene responsible for missing teeth in a large population. And that was quite a striking finding. But deep in my heart, as a clinician, I struggled to find meaning for that research. How could I translate that to patients? So I kept, on the side, a project that was very embryonic, very early in development, about a need to restore dental pulp tissues using biologically based therapies.

Everything we currently put in the mouth works really well, they're mostly gold standards for restorative dentistry. But we don't take advantage of the host response, of our own body's response, to injury and to healing. And this material was designed by my colleague, who was, at that time, starting his academic career. And he had this wonderful nano structured

Winner of the 2009 GSK IADR Innovation in Oral Care Award

Nanostructured Peptide Hydrogels and Stem Cells for Dentin-Pulp Complex Regeneration

material that had tremendous potential for applications to the clinic but he didn't have the biologic connections, so he came down the street and connected with me. And we were thinking about the project, for which we had very little data that would position us for the big grants, when GSK came along. And being the kind of person I am, I was nervous, because it said innovation. And I knew that the material was innovative, and its applications even more so but I was stepping out of my comfort zone to take on a new challenge.

The gift of the award money helped me unite the team of researchers at the University of Texas, Houston, with Rice University, a leading group in bioengineering. And I had a very talented graduate student who was getting her PhD at the time. It helped her formulate the goals for the project, allowed us to gather the preliminary data we needed to actually apply for a grant. And we were successful for this large award from the NIH. So, it was a transformative project that I think, career wise, placed me in the field of regenerative dental medicine, where I would not have been otherwise. So, I have many reasons to be grateful. For the actual money that helped buy the materials that were expensive at that time, ten or 15 years ago. I have always looked at GSK as a pioneer in making these investments for the future, and have encouraged as many mentees along the way, who've also become successful GSK awardees because of that experience I've had.

"When I define what I consider the crucibles or turning points in my career they always involve serendipity, the unexpected, the unknown merging with the opportunity to react"

When you reflect on your career, what were some of the key moments that helped drive your success, do you think?

When I define what I consider the crucibles or turning points in my career they always involve serendipity, the unexpected, the unknown merging with the opportunity to react. Whether that was a discovery that I paid more attention to that was completely unexpected, to taking advantage of an opportunity as it presented itself. And the GSK award mechanism was one way that I think charted a course for my career. So, I would say serendipity guided these key moments. The ability to be humble. To always realise that every success that you accumulate happened for a reason; there were people who helped you get there. And that there were many others who had far less than you, who achieved twice as much. Whilst there were also several people, who had opportunities more than I did, that, for some reason, could not make it. So, that keeps me in the centre of… almost an equilibrium of centeredness and humility, that has, given me a valuable perspective on life and academia. If you are on a track where you compete for funding, that is so competitive in the US, as it is in the UK, you have to be in the top 5% of researchers and I have been so fortunate to have uninterrupted funding throughout my career.

I think my ability to keep moving forward and onward has guided a lot of my career successes. I would say with the AADR and IADR, I have watched how the organisation has grown. I've also watched it face challenges where corporations have to look at their budgets and cut back on their level of support at the same time when support for funding has gone down. In the meantime, we're growing as a global organisation, and oral health issues remain, I think, the most common public health concern. So, when a company steps up, to go beyond what is expected, perhaps, of corporations, to support a track of development, such as you have, it has a tremendous impact on just where we are today, and where we hope to go in the next century.

IADR is preparing to celebrate a centennial, and that'll be in 2020. So, we have a whole century of achievements to be proud of. Knowing and understanding that what got us here is not going to get us there for the next century, right? Things have changed so dramatically, and so counting on a closer partnership with partnerships that is a true alliance, and it's not always financial – it could be far more than that, as you know – is very key for the future of dental research, in general, and then the organisation, itself.

What advice would you give to other dental professionals and scientists considering entering the field of oral health research today

To know and understand the tissues that form the dental, oral and craniofacial complex is to really experience being in a scientific playground. Because if you look carefully at what we have, there is nothing like these structures that exists anywhere else in the body. We have the hardest tissue; enamel – 98% mineral, almost like glass, that is irreplaceable when it's lost, because the cells that form enamel die. We

have the tongue, with its unique taste buds – a sensory organ system that is not found anywhere, that is so critical to our day-to-day functions, right? We have salivary glands that are producing a fluid that has multifunctional purposes, that if you don't have it, you really do feel the lack of saliva, and it has detrimental effects. And I can go on and on, describing every aspect of the face that gives us our sense of uniqueness and a sense of wellbeing.

So, the opportunity to study biological processes, whether that's the bio mineralisation of enamel, or the repair of dentine, or how periodontal disease, or the periodontium, stays in a healthy state, are fascinating systems for all of science. You have an opportunity here to study paradigms for tissue development, regeneration, and repair. So, certainly, for anyone thinking of oral health research, think about how important the smile is to an individual and how the complex network of genes and molecules actually result in all these tissues. And that we can have a little glitch in one single alphabet of DNA that can cause your face to be completely malformed, and stigmatise you for life, right? So, the need for research, the need to answer questions about humanity's most prevalent infectious diseases, that is caries and periodontal disease, globally present, threatening everywhere, even in more developed countries.

The fact that dentists can make the connection between the mouth and the rest of the body – so if you have a healthy mouth, you're likely to have a healthy body makes this a tremendously exciting field to get involved with.

That being said, dentistry has traditionally been a profession that is technically driven. So, we have materials that are absolutely mind boggling, in terms of the chemistry and the way they were set together. But we still have to do some catching up with where medicine is today. Regenerative medicine, the fact that we can target our therapies to meet individual needs, as is happening in cancer right now, dentistry and dental research has all of these resources now to avail of. And hence, we need more people entering the field that have a futuristic perspective, and are trained in modern science.

What would your personal advice be to researchers out there, looking to apply, and hopefully, be successful, for these types of awards?

The key term to be noted in the title of the GSK sponsored IADR award is innovation. Innovation is typically driven by a passion and this award is unique as it stresses on technologies and research that have the capacity to be leveraged into translational realms that would lead to therapies. That, to me, is a very noble goal to have in today's world. Because we question, and should be questioning, everything we do, even as educators and researchers, whether what we do is of relevance to general and oral health. Are we making a difference? And so, I would say that the term innovation must involve a soul-searching expedition, where one actually thinks about what is known in this area.

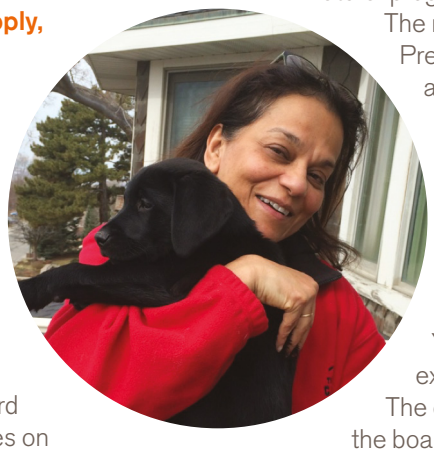
"We are doing a lot of very special initiatives for the centennial, that will honour the contributions of women over a century"

What do you think the future holds for you, as an individual, in the next couple of years?

I have reached the stage in my career when I decided not to have any plans for the future. I am happy to just let the future unfold as it must. I do have one guiding principle that I want to be in a place where I can make a difference and have the highest impact possible. It could be staying focused on my research, or moving into an administrative position, or giving back to the world at large in a more humanitarian way. I'm open to all possibilities.

Does the presidency of the IADR fit in that future time horizon?

Yes. I think, because I've been on the board for three years, and served as president of the American Association of Dental Research, I just saw that as a natural progression to my career.

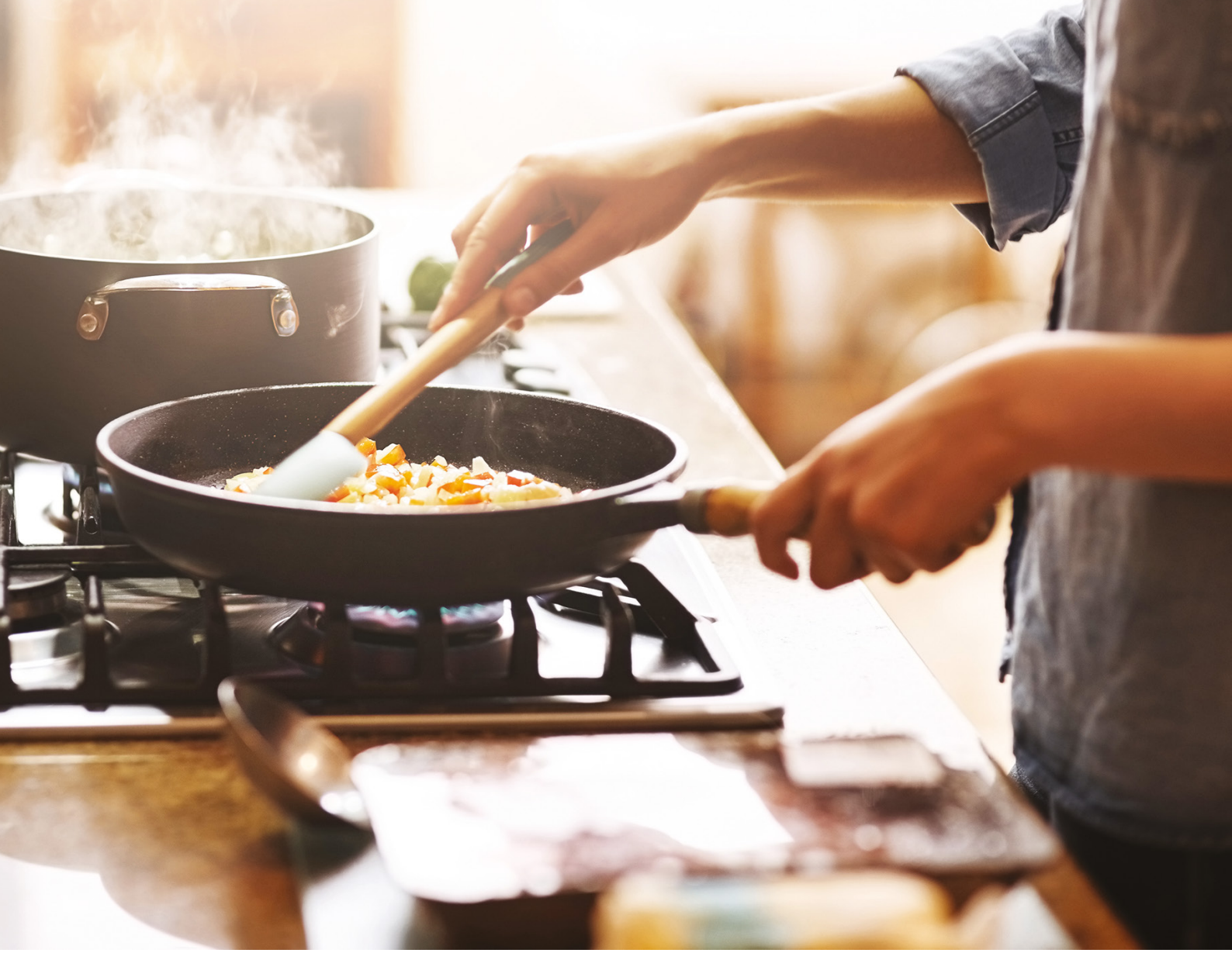


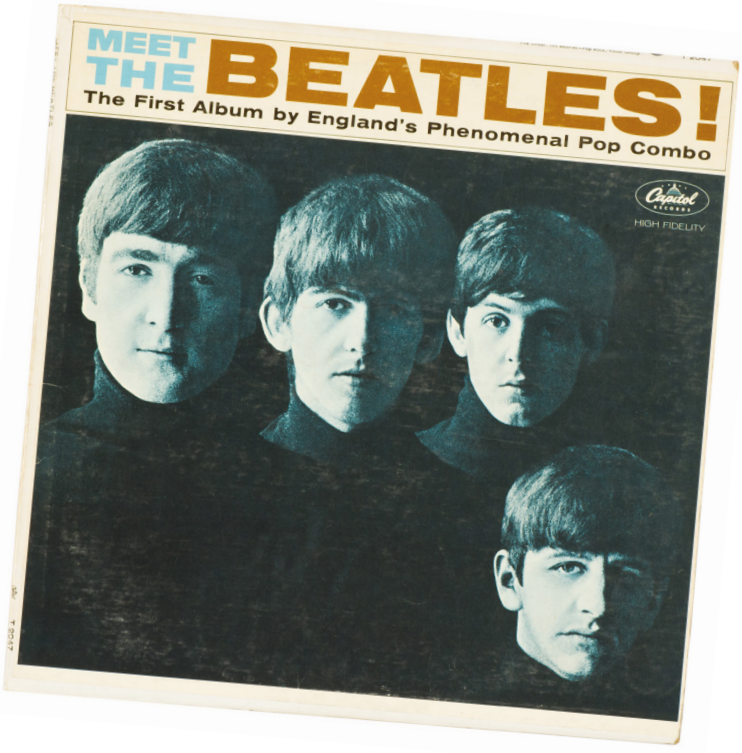
The role of IADR President is more than a figurehead role, it's more than feeling that a red carpet is rolled out for you, wherever you visit around the world. And it truly is a global role. You travel a lot, extensively, globally. The organisation, the board, is setting up programmes, several, of which I am completely devoted to, to promote women across the world – in Africa and the Middle East, in Latin America, China and Japan. The programmes are designed to enable women to feel empowered to find that there is a place for them in the profession. We are doing a lot of very special initiatives for the centennial, that will honour the contributions of women over a century. We're also trying, for the first time, to set up a network of students across the world.

Could you tell us something about yourself that might not be on your professional resume?

I love to cook, so I consider myself a gourmet cook, but you have to judge that one day. I love to cook and I love to eat. And that has forced me into loving the outdoors, because now I have to exercise with my Labrador, who loves it, as well! I have a lot of interests in reading, and a passion for people. Very much so in understanding the human process and what makes individuals so unique and makes them tick.

I'm a lover of classical music. I got trained on the piano and did all the Trinity College exams. I don't do enough of that, but I am an avid supporter of the arts. I would say my passion is choral music. I've performed large choral masterworks. I can't do that this year because IADR's travel makes it impossible to meet any of the concert dates.





What is your favourite piece of music?

So, being raised, I see it would be in my genre here, you know, with the Beatles, and Simon & Garfunkel, and Peter, Paul and Mary, I have a great love for that genre of music. If I had to pick one that I would want played, it sounds really morbid, but if I had to… at my funeral, I have two pieces. Faure's, and Bach's B minor mass. And why do I say that so convincingly amongst all the great choices available? It's that always, when I listen to these pieces, they show me a bit of heaven. I just see a bit of heaven, and it takes me to a place that I'm not normally in, to a higher place, thinking. So, it's very refreshing for the soul, to listen to those magnificent pieces of work.

Rob Allaker

Professor of Mucocutaneous Microbiology and Director of Graduate Studies, Barts and The London School of Medicine and Dentistry

Professor Rob Allaker began his career at the University of the West of England and completed a PhD in Skin and Oral Microbiology. He was awarded the GSK IADR Innovation in Oral Care Award in 2010 and in this interview with Mhari Coxon and Steve Mason from GSK, Oral Health, he speaks about his career background and the influence of the award for his development.

Thank you for your time today Rob. Can you start by telling us a bit about your career to date?

I work at Barts and The London, School of Medicine and Dentistry which in turn is part of Queen Mary University of London. I am a Professor of Mucocutaneous Microbiology which relates to the microbiology of the skin and the adjacent mucosal sites including the oral cavity.

I graduated way back in 1982 from the University of the West of England with a BSc in Applied Biological Sciences which included a year with AstraZeneca Pharmaceuticals. I remained in Bristol to undertake my PhD and that was on the production of inflammatory compounds from skin and oral bacteria.

In 1986 I joined the Royal Veterinary College as a Wellcome Trust postdoctoral fellow to explore the use of bacteria interference in the control of staphylococcal skin disease. I joined Queen Mary as a lecturer where I continued my academic career and eventually became a Professor in the year 2011.

"...be open minded and ready to diversify in terms of research. Make the most of every opportunity as it comes..."

Rob what advice would you give to fellow academic dental professionals and scientists when considering to enter the field of oral health research?

My advice to people considering entering the field of oral health research would be to keep an open mind and ready to diversify in terms of research. Make the most of every opportunity as it comes whether big or small. Collaborate, collaborate well, attend and present at meetings. Work with your industrial partners because they really do keep you in touch with what's out there and be lucky!

"One of the great things about the GSK IADR Innovation in Oral Care Award it is that is open to people worldwide which is fantastic."

Thinking about the GSK IADR Innovation in Oral Care Award, could you tell us what it meant to you personally and professionally when you won the award?

Yes I can even remember back to April 2010 I got a call from your Executive Director at the time, Chris Fox, to let me know that I'd won the award and it was all very inspiring. Winning the GSK IADR Innovation in Oral Care Award really did act as a springboard to further success on related projects; looking at technology-based implant, both dental and orthopaedic coatings. We've been very successful in this field as a result with subsequent funding from Orthopaedic Research UK, the Dunhill Medical Charity and now we've got a very major award with Innovate UK which involves the global company, Johnson Matthey and another SME, a small/medium enterprise called Promethean spin out company based in Nottingham.

And of course I'm sure it was all important in my further application to professorship the following year. So it's been, you know, a very good success.

One of the great things about the GSK IADR Innovation in Oral Care Award is that it is open to people worldwide which is fantastic. There is truly an opportunity for everyone and it is one of the things the IADR prides itself on – having divisions worldwide not just the main global centres.

When you reflect on your career, what were some of the key moments that drove your career and helped you achieve success in the professorship that you now have?

Well number one winning the award of course, and along the way being introduced to key collaborators which really opened up areas of antimicrobial research related to the oral cavity nanotechnology, host defence peptides and nitric oxide research. And the timing was fantastic because it was just as these areas were becoming particularly topical

What does the future hold for you?

Currently I work with global and smaller industrial partners which is fantastic. And here at QMUL I'm Director of Gradute Studies within our Institute of Dentistry which keeps me busy.

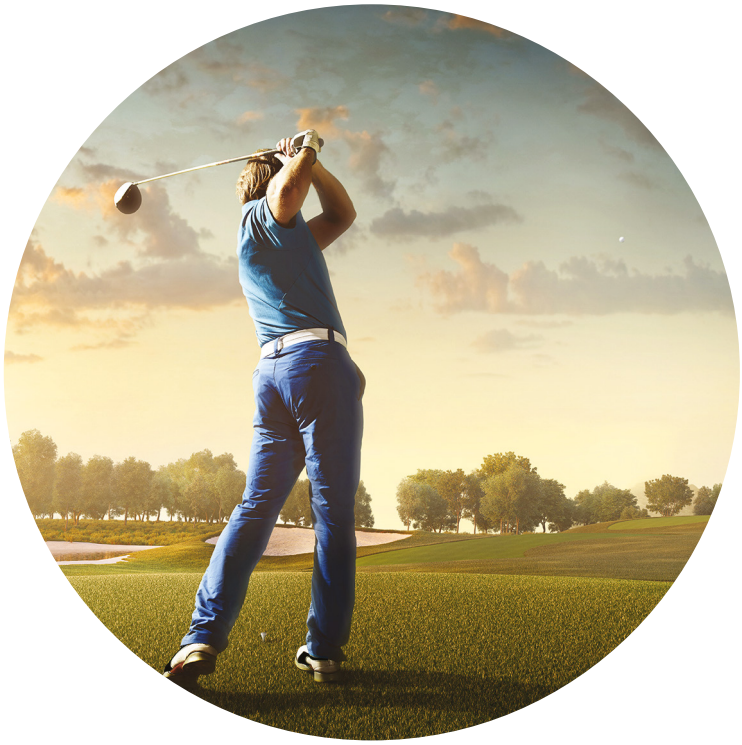
Winner of the 2010 GSK IADR Innovation in Oral Care Award

Multifunctional Nano-biomaterials for Implant-based Dental Reconstruction Products

In regards to the IADR GSK Innovation in Oral Care Award and similar awards what's your advice to researchers out there looking to apply?

I would advise anyone thinking of entering to get lots of advice and help with putting the actual application together but in particular the translational, developmental and business-related elements. And demonstrate plenty of innovation.

"I would advise anyone thinking of entering to get lots of advice... in particular the translational, developmental and business-related elements".



I wonder could you tell me something about yourself that we might not see on your professional resume?

Well I enjoy walking, particularly long distance walking and cycling in the countryside. I have walked the West Highland Way Coast to Coast and other routes, mainly in the UK. Also, like a lot of others I play golf successfully, or not so successfully! I wouldn't like to mention my handicap - let's just say if I go around in under 100 I'm pleased! It's amazing to hit such a small ball with a long metal stick, you know, to go where you want it or not to go where you want it!

What is your favourite song or piece of music and why?

Well my all-time favourite musical artist is Van Morrison and I suppose really it's his song, "Days Like This" because that really does conjure up the image of a perfect day when everything fits into place.

David Wong

Professor, Associate Dean for Research, Director for UCLA Centre for Oral/ Head & Neck Oncology Research (COHNOR))

In this interview with Mhari Coxon and Alyson Axe from GSK, Oral Health, David shares the highlights of his career, his experience of winning the GSK IADR Innovation in Oral Care Award and his future plans.

David could you tell us a little bit about your career to date?

I did my dental school training in Vancouver, British Columbia and then I did my residency and graduate training at Harvard University where I started my career and spent 21 years. For the last 14 years I have been at the University of California, Los Angeles.

I am currently the Felix & Mildred Yip Endowed Distinguished Professor at University of California at Los Angeles. I'm also the Associate Dean of Research and Director of the Center for Oral Head and Neck Oncology Research.

"The opportunities for anyone considering entering oral health research are immense."

When you reflect on your career, what were some of the key moments in your career that helped to drive your success?

During my career the scientific journey has been very gratifying. It's always been a privilege to engage in academia and oral health research and there were two defining moments as I reflect on the scientific journey. The first is in the early 80s when I began my residency and graduate training and that was the year when the first human oncogene was discovered by Michael Wigler, Cold Spring Harbor, Robert Weinberg at MIT and Geoffrey Cooper at Harvard Medical School. And I was this freshly graduated dental student that arrived on the Harvard campus and I said to myself, if these scientists could independently go into a human bladder cancer cell and amongst all the genes that were expressed, all converged on the same transforming oncogene (HRas) that turned a normal cell into a cancer cell, I was inspired to acquire the knowledge base, the skill set, and bring it back to dentistry, oral health. That was a very enabling experience and there laid my subsequent six years, learning how to acquire that knowledge base and skill sets.

The second defining moment is when I moved from Massachusetts to California some 14 years ago when the National Institute of Health, the Dental and Craniofacial Institute began to 'invest' in the scientific community to advance and translate saliva into a clinical reality. That was a very defining moment for me because the thought that scientists and oral health researchers we can eventually advance saliva to a clinical utility for monitoring diseases. And that was 14 years ago, and the journey has not waned. The momentum escalates on a daily basis and the GSK initiative was very enabling in sparking, catalysing those early initiatives to perhaps being two to three years away to see the first regulatorily approved and impactful personalised medical application in saliva for cancer detection.

"I really applaud the awards for the efforts and the investment in the oral health landscape and I thank GSK for that."

So what advice would you give to other dental professionals and scientists considering entering oral health research?

The opportunities for anyone considering entering oral health research are immense. There are now genuine opportunities to develop personalised and precision medicine and dentistry.

What did it mean to you personally and professionally to win the IADR GSK Innovation in Oral Care Award?

I have been fortunate enough to win two GSK IADR Innovation in Oral Care Awards. The award reflects the spirit of the investigator. The first award was very enabling that the scientific concept was of interest to an industrial magnate GSK. My advice to anyone interested to enter would be to just do it – there's nothing really stopping you. Maybe I will go for a third application!

The GSK IADR Innovation in Oral Care Award is truly catalytic. It is conceptual, visionary and engaging and can define an investigator's career. I really applaud the awards for the efforts and the investment in the oral health landscape and I thank GSK for that.

What does the future hold for you?

The future is tremendously exciting from scientific perspectives. The academic journey is a privilege, particularly the scientific journey. My work with saliva, advancing the utilisation of a fluid that is part of our profession. The holy grail of diagnostic work is non-invasiveness. Saliva offers the same insights as we gain from taking blood or cerebrospinal fluid but

Winner of the 2007 & 2011 GSK IADR Innovation in Oral Care Awards

SCPSS: Enabling Technologies for Salivary Biomarkers for Clinical Applications

through a truly non-invasive way.

We produce around a litre of saliva on a daily basis. Non-invasively, non-painfully and without any patient embarrassment, we can capture and monitor it for disease discriminatory information. We are now footsteps away from advancing this capability, harnessing this information and training the salivaomics targets for clinical applications and then achieving regulatory approval and it into medical and dental practices.

"...we can envision the day that we can go into a health check and at the same time be monitored non-invasively for important diseases and metabolic disorders or even cancer."

This journey for the past 14 years, inclusive of this catalytic engagement with the GSK initiative, enabled this translational journey of looking at oral fluid saliva for impactful translational as well as clinical utilities. And we're literally footsteps away from clinical maturity. And also, at the same time, there is a facet of this development that's impacting on the biology to oral and systemic health.

The recent discovery or realisation that there are these vesicular entities communicating between different parts of the body, from blood to cerebrospinal fluid and also into saliva opened up a new landscape of how that could impact on oral health as well as systemic health that we didn't know of before. The clinical utilities clearly are going to be very innovative and very impactful.

We can envision the day that we can go into a health check and at the same time be monitored non-invasively for important diseases and metabolic disorders or even cancer. And at the same time there is realisation and understanding of constituents in saliva that could impact on oral health as well as systemic health. This landscape is just about to emerge, it will be tremendously exciting and impactful.

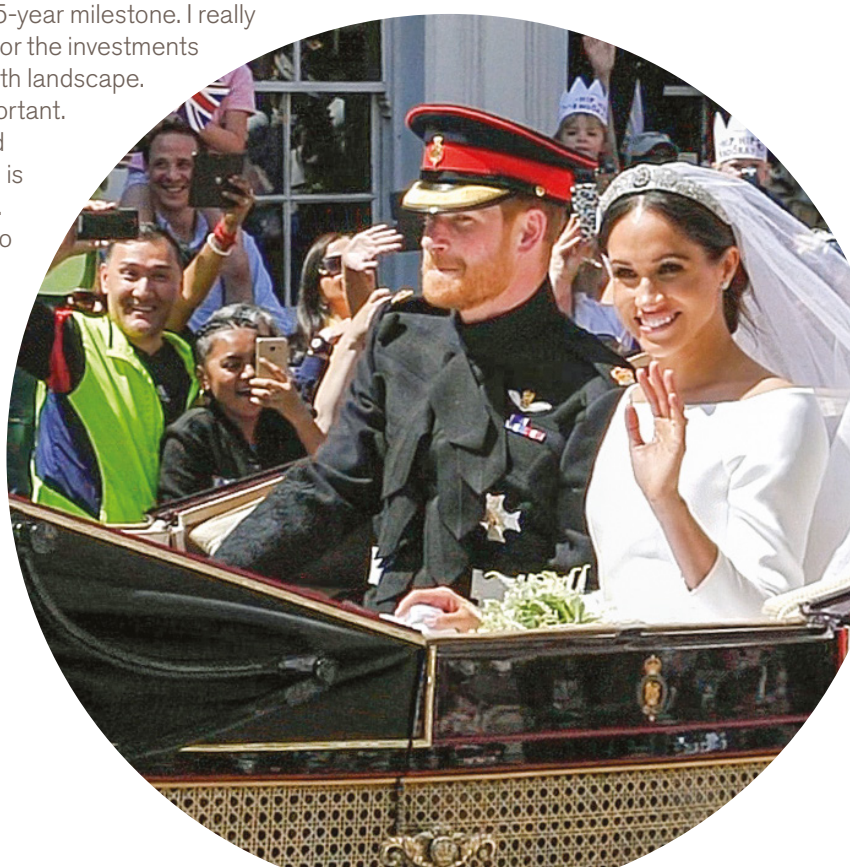
In regard to the GSK IADR Innovation in Oral Care Awards and awards like this, what is your advice to the researchers out there looking to apply?

Pursue these opportunities, particularly an initiative like the GSK award, because it's catalytic. It really is. It's conceptual, it's visionary, and it's engaging. It defines an investigator's career as well.

And the fact that the GSK IADR Innovation Oral Care Award has a 15-year history is important demonstration of a visionary initiative that is at the 15-year milestone. I really applaud GSK for the investments in the oral health landscape. And that's important. It's a dedicated landscape and is our profession. It's dentistry. So yes, it's a very important initiative, and I really thank you for that.

Just to end on a light-hearted note, I wonder if you'd tell me what your favourite song or piece of music is, and why?

So Mhari, if it means anything, these two songs are on my HomePods at home as well as in my vehicle, and I play them repetitively. Beethoven's Symphony No. 9 being one of them as well as, from my high school days, I've been captivated ever since by Elton John. Your Song from his second album is very defining musically and lyrically, to this day. I was thrilled to see Elton John at the royal wedding last week. And so yes, those are my two, sort of, staple entertainments, so to speak.



Janet Oldak

Professor of Dentistry at
University of Southern California

Kavita Sud, from GSK, Oral Health, interviews Janet about her career, her research dedication to the creation of synthetic enamel, and the GSK IADR Innovation in Oral Care Award.

Can you tell us a little bit about your career to date?

I graduated with a Bachelor's degree in chemistry, from Ben Gurion University and then continued my masters in structural chemistry, and a PhD in structural biology, in the Weizmann Institute of Science. I studied biomineralisation, which is the science of studying formation of minerals in nature, in particular sea shells as well as focusing on bones and teeth. I came to the USA in '92 to pursue a postdoctoral fellow with a desire to bridge the disciplines of chemistry and biology and that's where I started to work on dental enamel including the proteins and enzymes that are responsible for formation of enamel during development.

I have a passion for science and research and was fortunate to secure funding for my research from National Institute of Dental and Craniofacial Research of the National Institute of Health in the United States. During my tenure I have expanded my studies and spent many years on basic scientific principles of how hard tissue is formed.

"Share your draft proposals with experienced colleagues or scientists to gain feedback"

I hope that one day we can prepare synthetic enamel, which will be used as an alternative to dental restorative material. In the last seven to ten years we have expanded our studies in this direction which has taken us more into remineralisation and enamel regrowth.

How far away do you think we are from having a synthetic enamel material?

In the field of biomedical research, tissue engineering has been a very active type of research. People use stem cells, try to get the cell to make the tissue and then the organ. In dentistry investigators use stem cells as the basis for making the whole tool. But when it comes to enamel, it's really challenging. For a start, when enamel is eroded it does not regenerate.

"We have developed a technology which hasn't quite reached the complex hierarchical structure of enamel but is at a level which will be functional"

Mature enamel is a dead tissue as opposed to bone where there is a constant remodelling. And we don't have a stable and appropriate cell line that we could use to regenerate enamel. Why? Because enamel formation is very dynamic, and ameloblasts, the cells that make enamel, have a unique character. They change their character – from the early developmental stage they differentiate and at every stage they are different in shape and how they behave until they die.

So, the challenge in science when it comes to enamel is really which stage in cell development you take. To merely stabilise the cell line that can represent a very critical stage. Because we need all of the stages – we start from a very soft material when enamel forms and it then becomes very hard.

Investigators are still trying to work to get a cell line that they could use to regenerate enamel. Enamel cells are intimately connected to dentine cells or odontoblasts and to separate them is a challenge as they work together.

So, we thought, okay, let's just forget about the cells, and let's engineer, let's use chemistry and engineering approach to make enamel. Because the whole formation of enamel, in the body, in the tissue, in the gum, is extracellular. Because the cells secrete all the materials, proteins, and ions, and enzymes, and the formation happens outside of the cells. We have been undertaking an engineering strategy which focuses on events once all of these elements are out.

The approach has been to study proteins that are critical in controlling these processes, use them in the tube and synthesise crystals that could be similar to enamel, in terms of their size, orientation and property. But the more we study, we realise the complexity of these processes. We have developed a technology which hasn't quite reached the complex hierarchical structure of enamel but is at a level which will be functional and has improved properties and functions to be better than the dental restorative material we have now.

What did it mean to you professionally and personally to win the GSK IADR Innovation in Oral Care Award?

Professionally it was extremely rewarding to realise that all the years of doing experiments and basic science and publishing, brings something useful for oral health and patients with pain or sensitivity. The funding that we have received from the award supported us in our journey in terms of pre-clinicals and basic science studies.

Winner of the 2015 GSK IADR Innovation in Oral Care Award

Repairing Tooth Enamel with Chitosan-Amelogenin-based Hydrogel

When you reflect back on your career what are some of the key moments that you feel helped drive your success?

There is a lot to reflect in the last 25 years. Moving on in a tenured career or the notification when you gain acceptance in a high impact journal or when you receive notification on a good score in a grant proposal really sticks in my mind as key moments. I had a publication in Science, and I remember that it had an impact. Another aspect is watching the success of younger colleagues who have passed through your lab onto careers as really successful doctors or oral surgeons.

"I hope that one day we can prepare synthetic enamel, which will be used as an alternative to dental restorative material."

What advice would you give to other dental professionals, or maybe young scientists, considering entering oral health research?

Well the first thing I would say would be to make sure you are really passionate. When it comes to working with a proposal for GSK-IADR make sure you have an innovative idea that has market potential. Share your draft proposals with experienced colleagues or scientists to gain feedback. And get the best collaborators that are complementary to your expertise. For example, if you are a biologist make sure that you have a periodontist if your proposal deals with periodontal ligaments. It's a team effort. It's not a lone effort. We always say "we"; we never say "I".

So tell me something that isn't on your professional resume?

I love to do yoga. I started it 15 years ago, really as a way to deal with the stress and to learn to balance. I've always been active – exercise and jogging – but with yoga, like in life, it's important to find the balance between strength and flexibility.

What is your favourite piece of music and why?

I don't have one simply because I emigrated twice in my life. I had to change languages; I speak four languages and so I cannot think of ONE song. I love Persian traditional music. I can dance to salsa and samba, because I love Latino music. And I grew up in Israel, so when I listen to Israeli music, I really can connect. But it's hard for me just to pick one.

One final question for you then. Do you have an oral science joke you could share?

Okay. You've got me on that one. Let me see; there are many of them. One of the famous jokes is, what is the most valuable award for a dentist? A dental plaque!

Nick Jakubovics

Senior Lecturer in Oral Microbiology, School of Dental Sciences, Newcastle University

Nick Jakubovics' career has involved the study of microbiology in the UK and the USA. In this interview with Mhari Coxon and Dave Bradshaw from GSK, Oral Health, he reflects on the importance of oral health research globally and expresses the need for people from multiple disciplines to work together to help tackle oral diseases which are essentially preventable.

Nick can you tell us a little but about your career to date?

I trained originally in biochemistry, at the University of Cambridge. Very few oral microbiologists actually intend from the outset to go into that area. It's quite specialist. I developed an interest in microbial biofilms, which are assemblages of microorganisms that are associated with surfaces, and cause problems in all sorts of different domains. It left me quite open looking for a PhD and I got a PhD working on biofilms in tap water distribution systems at Warwick University.

After that, I was looking around for other biofilm-related problems. And that's when my first postdoc really took me into the field of oral microbiology. I was very lucky to get a postdoctoral position at the University of Bristol, with Professor Howard Jenkinson, who was one of the leading experts in the world in oral microbiology. I stayed there for about six years.

And then, again, I was very fortunate that I was able to move to the United States, into Paul Kolenbrander's lab at the National Institute of Dental and Craniofacial Research in Bethesda, Maryland, where I spent three years working as a postdoc, before I got my lectureship back at Newcastle in oral microbiology.

I do really miss the US. I still collaborate a lot with contacts that I made out there which is brilliant. It is such a good research community over there. So I do miss it.

When you think back on your career, what were some of the key moments that helped to drive your success?

My postdoc research was a key defining moment in my career. As a postdoc, one of the key things is getting data, good data, and getting them published. When I first started my postdoc, it was just in the year that things like genome sequencing were starting to come out. It was three years after the first genome sequence was published, of a bacterium. I was very lucky that they accidentally sequenced the organism I was working on, as a contaminant to another project. The Institute for Genomic Research at the time put up the sequence on the web, and my boss was very sharp and managed to download it. So, we had this text file, essentially, of DNA sequence, and that led me, actually, to identifying the gene that was the target of my three-year postdoctoral project.

The actual grant was written in a way that we weren't even aiming to identify the gene because it was too difficult. We're just going to characterise the system. Within six months, I'd managed to find the gene by working on this sort of genome sequence. And when I came to publish it, the reviewer couldn't understand how we'd managed to find this gene.

And it was in the very early days of bioinformatics coming in. Now there's a whole science of bioinformatics, analysing genome sequences.

But my bioinformatic method was actually using a word search, with various ambiguous characters I had to explain all that in my response to the reviewer. That really gave me a very quick boost to my first postdoc, and allowed me to start publishing, which was great.

I had a small travel grant in my first postdoc, which took me over to Paul Kolenbrander's lab in the US. It was just a two or three-week placement but the contact that I made through that then led me to going back and doing a full postdoctoral fellowship in Paul's lab a few years later. So, this kind of travel award and this collaboration is really important, and that really helped with my career.

And then one of the other things that I remember very much about my career, that's been very helpful, was the engagement that I did around a result that I had back in about 2012, where we actually put out a press release because we'd shown that an enzyme we were working on potentially could destroy biofilms. And it's the subject of the IADR award. It's an enzyme I've been working on for a long time. But we had a lot of media coverage around it.

Our press office was really great in helping me publicise it. And although I'm not naturally someone who would necessarily go straight to the media, that media coverage really helped me, because it showed—particularly to industry—that we were serious about trying to translate our research.

And that led to a lot of industry contact, which has been invaluable ever since. And in future things that I've tried to do, grant applications that I've tried to make, we've tried to bring in industry.

The research area I work in of biofilms is very much one where industry has a lot of issues, and it's really important that people in academia work with industry, and also work with the NHS and clinicians, in order to all work together and solve quite difficult problems. It's amazing how these

Winner of the 2016 GSK IADR Innovation in Oral Care Award

Control of Oral Biofilms using a Natural Marine Microbial Enzyme

things work, isn't it? You do have to kind of go out and get out there and not sit in your ivory tower, I suppose, is the old phrase.

Okay, so one of the things that really helped my career, actually, to get off the ground, after I got my lectureship, was an award, a relatively small award, but one from the Society for Applied Microbiology. It was called the New Lecturer Award. And that really gave me just… It wasn't a huge amount of money, but it gave me the momentum to get a project off the ground.

I was interested in the idea that biofilms might contain extracellular DNA, which had come out of the cells that were in the biofilms, and that, that might be important for holding them together. And although that had been shown in other systems, it hadn't been shown in oral microbiology.

And this small award, actually, really got my research project off the ground, and I've been working on it ever since. It's been the subject of the award that I got from GSK IADR, and it's really been a great and very fruitful area of research. So, again, I think that's one of the really important things that's helped me, this award from the Society for Applied Microbiology.

If you were thinking of giving advice to other scientists, dental professionals considering entering oral health research, what would be your advice, Nick?

If anyone is considering entering oral health research I would say it is a really important area - we need to remember that even now, in the 21st century, dental caries is the number one most prevalent disease worldwide, and periodontitis, gum disease, is not far behind. These are really big problems.

And even though, they are, theoretically, largely preventable, they're clearly not being prevented because they are so common, and they have such a big impact on people, not just in terms of pain, but in terms of time missed off school or work, which then has economic implications. And treating oral health is huge, in terms of the money that goes into it. If we could bring in a product that just helps to keep people's oral health a little bit better for a little bit longer, it will potentially have huge implications, because it's such a broad problem.

"I would encourage people to think outside the box a little bit. Research can be really rewarding. If you make a difference in research, it can affect millions of people across the globe"

And then the other thing I would say is that we really need oral health research. We need people in all sorts of disciplines to come together. Science is moving in this direction anyway, broadly, that we can no longer work just on our own, on small projects. We have to work together because the challenges we're facing are becoming more and more complex, and the tools we're using are more complicated.

We need people from all sorts of different disciplines, from microbiology and immunology to computer science and engineering and these kind of disciplines, to make a real difference. And we also need clinical researchers, so that we can then translate our findings. A lot of people who train as clinicians, just think of a career in dentistry. That's always what they've been focused on.

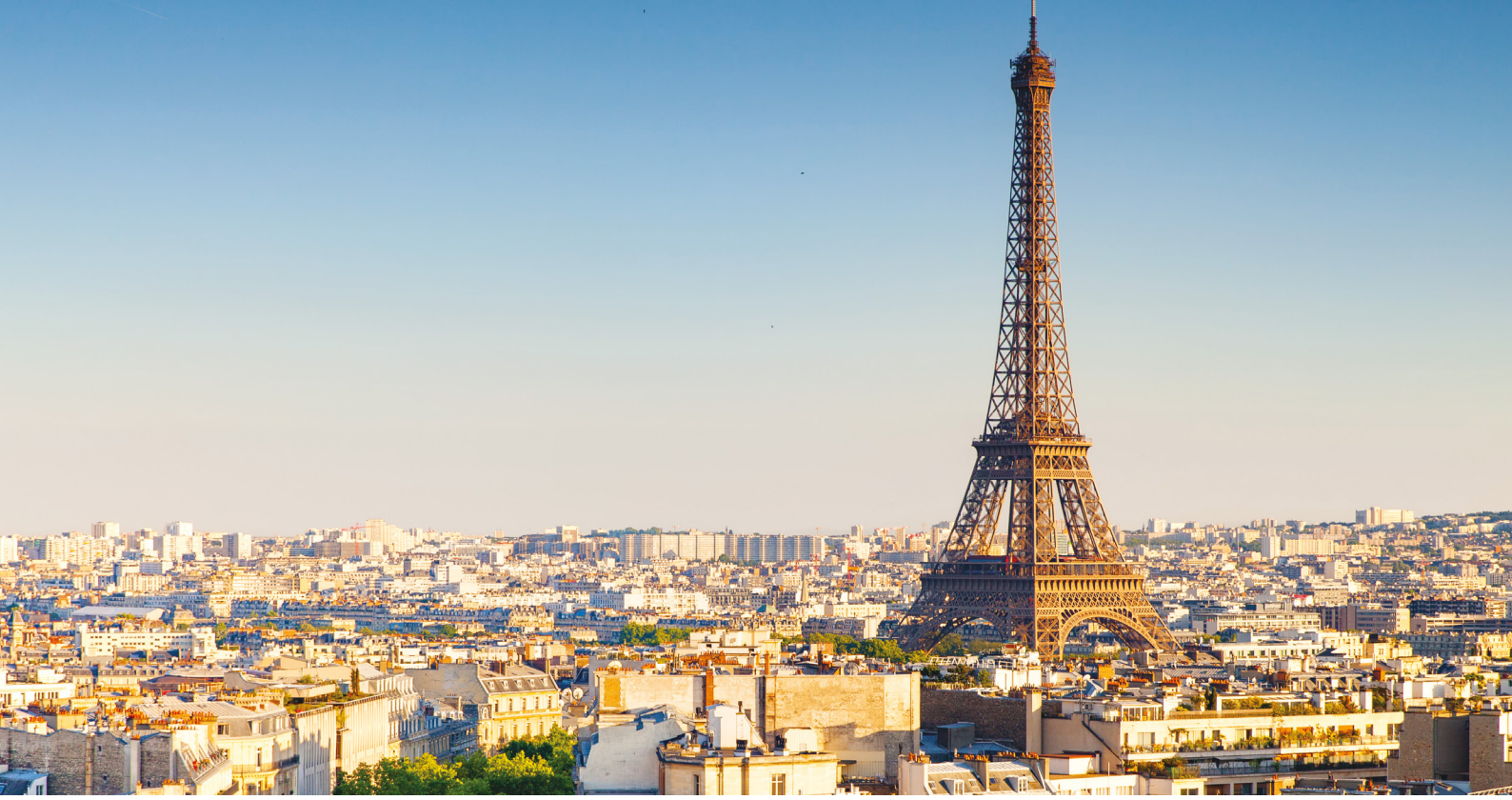
I would encourage people to think outside the box a little bit. Research can be really rewarding. If you make a difference in research, it can affect millions of people across the globe. Whereas, practicing dentistry, it's important. it will affect your patients, and it's certainly important to do it. But, really, research has that potential to make a big difference. So I certainly encourage people to go into oral health research.

And I already collaborate a lot with mechanical engineers here, and computer scientists as well. So, you know, I've already set up a lot of these collaborations. But, when we put in a recent bid for a National Biofilm Centre, it was really eye-opening how many different disciplines were interested in the topic of biofilms, broadly, as important.

Thinking back to the GSK IADR Innovation in Oral Care Awards, what did it mean to you professionally and personally to win that award?

I was lucky to win the GSK IADR Innovation in Oral Care Award in 2016, and so it's actually still ongoing. We're just coming towards the end of the project. Professionally, there's absolutely no doubt it's made a huge impact to my research group.

I was very lucky. I was able to combine the award with a little bit of funding that I had from my own institution, Centre for Oral Health Research at Newcastle. Between the two, I was able to employ a postdoc, Nadia Rostami, for the two years, and she's still working in the lab. And it's just been great to have a postdoc there, a senior figure in the lab. It's really pulled the lab together. And on top of that, Nadia published a very nice paper just early in 2017, in the Journal of Dental Research, which came directly off the back of this work. So we've already



managed to get our work out there and publish it.

And then following on from that, I've recently become an Associate Editor for Journal of Dental Research. One thing leads to another, and now, I really feel that I'm in a great position, which has all come about because of getting the award. From a personal point of view, it's really given me a bit of confidence as well, because it's so hard to get grant funding in this day and age, particularly in a fairly specialist area like oral microbiology.

In regard to the GSK IADR Innovation in Oral Care Award and awards like this, what would be your advice to researchers out there who are looking to apply for those kind of awards?

My advice to people thinking of entering the would be to go for it. Because if you don't get around to applying you won't ever get the funding! In terms of crafting a strong application, I think you need to really understand what the funder is looking for, in any kind of award programme. What are the criteria they're looking for? What are the rules of the grant application?

Really read up on it and find out as much as you can. If possible, talk to people who've got the award. One of the things about this particular GSK IADR award is that they do publish on the website previous award winners, and, obviously, this whole interview process is about engaging previous award winners. People are quite happy to share their experience.

A lot of award programmes are really wanting you to have in your mind or to demonstrate that you've really carefully thought about the pathway to your impact. So, if possible, try and set up those collaborations with the kinds of people who can help you to have impact, which may be clinical researchers. You may not be doing a clinical component right at the moment, but in future, you may need that to get your product out there. And also, working with industry, because ultimately, industry is well positioned to translate findings, actually, and move them towards the market.

What does the future look hold for you now? What's your ambition for moving forward?

Okay. So I really enjoy doing research, and I hope that whatever the future holds—it's, obviously, quite hard to predict what's going to happen—but I really hope that I'll have the opportunity to carry on developing my research, and doing more research, and working with lots of other people.

One of the great things about research is meeting people from different disciplines, and talking to people and collaborating. So I will continue to work with the collaborators I work with already, and I always look to branch out and work with other people, other companies or whatever.

At the moment, with the current award coming towards an end, my immediate priority is to try and bring in some more grant funding. So I'm hoping that all the data that we've generated during the project will help us then to attract more funding. So that's the immediate plan, to just keep my lab going and really carry on with the research.

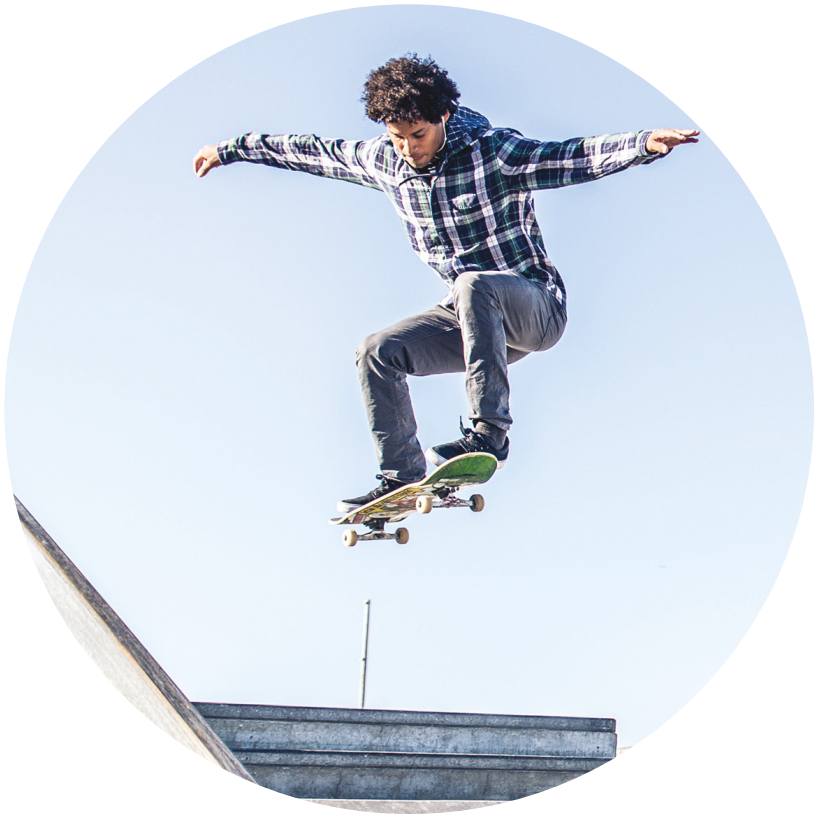
Could you tell us something about yourself that's not on your professional resume, that maybe people don't know about you?

Okay. So where to start? One of the things I really enjoy, outside of work,

is cycling. And I cycle to work every day. It's about 10 miles each way, so I get a good ride each way. And I've done some really good long-distance rides. I did London to Paris a while back, on a tandem, with my friend Al, and Al is just fantastic. He's got various health problems, and he's visually impaired, so obviously, he was on the back. Although, I think, actually, we'd have navigated better if he'd been on the front, because I ended up on the motorway at one point! But anyway, we did make it to Paris in three days, which is great. And we also did the coast to coast—so starting in Whitehaven and ending up over in Tynemouth—a few years ago.

But I must admit, nowadays, sometimes, I have to take my kids to school, so I don't always manage to cycle. And then I park about a mile away, across Town Moor. And I just get a bit frustrated when I'm wasting time and I need to get into work, so I've been exploring other options for getting across Town Moor. What I've settled on recently is a skateboard. So, I taught myself to skateboard last year, at the tender age of 44, and now I take my skateboard and skateboard across Town Moor to get to work.

and so on, and then we realised it said over 18s only on it, and my son is only nine. So I don't think we can go!

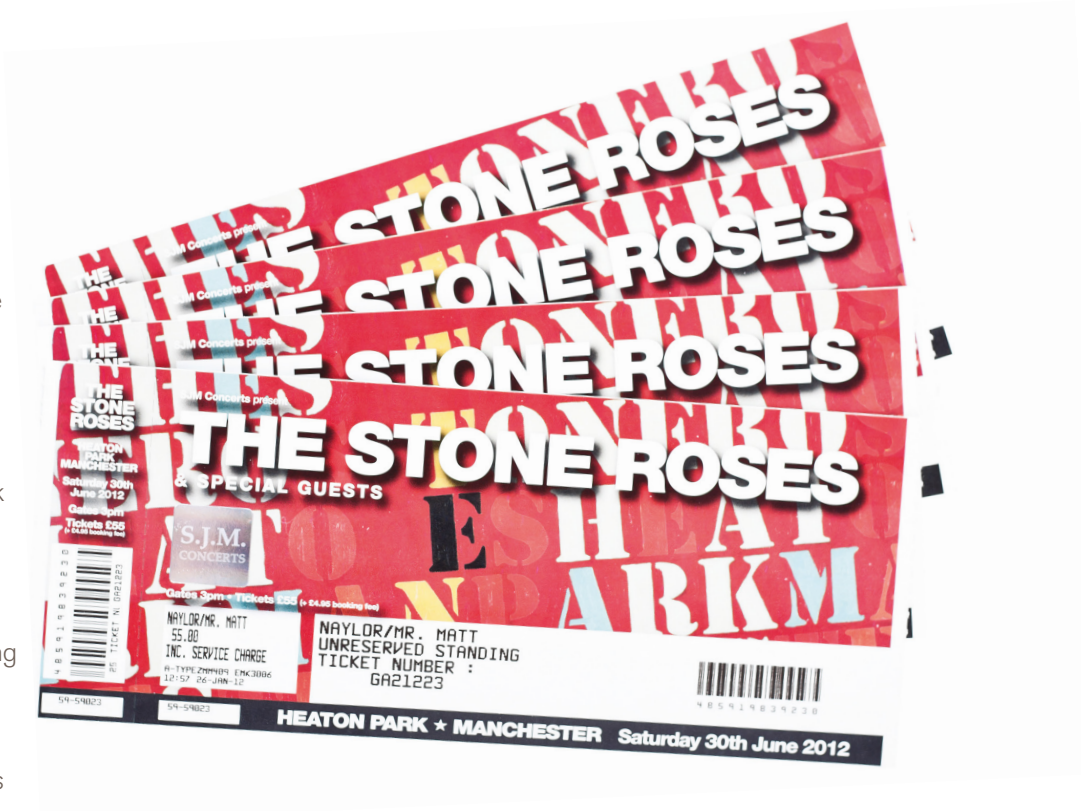


What is your favourite song or piece of music, and why?

Okay. So I guess I was a sort of 90s indie kid. I got into all the indie music back in the late 80s, early 90s, and I guess I've never really moved on. You kind of get stuck in your era. So I would say, definitely, something from that sort of reminds me of some great times I had at school and college.

So something like, for example, my first album that I bought was Stone Roses, and Made of Stone is a track that I really enjoy, and it just brings back so many happy memories.

My son really got into the Levellers. So we were looking at going to their concert as The Levellers are coming up this way later in the summer. We were going to get tickets



Grayson Marshall

Distinguished Professor Emeritus, and Professor on Recall, University of California, San Francisco

Grayson William Marshall, Junior, answers to both Grayson, his father's name, and Bill from his middle name. Ahead of his upcoming retirement from University of California he speaks with Kavita Sud and Charlie Parkinson from GSK, Oral Health, reflecting on his research career journey and looks ahead to a future of family, travel and of course a continued interest in research.

Can you tell us a bit about your career journey?

I was born and raised outside of Baltimore, Maryland, and after growing up there I went to Virginia Tech and did an engineering degree. I decided to go to graduate school, and I got a PhD in Materials Science at Northwestern University. Shortly after that I did a post-doc at Northwestern in a new emerging field called biological materials, which had fascinated me and subsequent to that I joined the faculty at Northwestern. I was interested in orthopaedic surgery materials and dental materials. And as time went on it became clear that dentistry had more interest in the kinds of things that I was doing so I became more and more interested in dental materials.

"One of the key things is you have to find the right collaborators, and sometimes you have to go through a lot of people in order to find those right collaborators"

In fact, I decided that I should probably try to enhance the academic profile of the dentists who were on our faculty at the time. And so I decided I would go back to school again and do a dental degree, which I did. My wife came along about this time, a little earlier than that, and she joined the faculty as the first woman PhD out of Northwestern, also in Materials Science. So, we've been collaborators for the last 45 years, I guess. That's been very good from that standpoint.

"My wife and I have been collaborators for the last 45 years"

So, I designed a special program to enhance the academic scholarship of dentists in our dental school. And when I finished my degree I started to put that program into practice, which was designed to plug in dentists into dental scholarship. People who were clinicians into a research project.

However, we also became quite attractive to other people as a couple, and so we were recruited to come to UCSF, which we did in 1987. And I was still interested in that sort of thing, in that research area and developing clinical research programs. I went back to school again at Berkeley and did a public health degree in epidemiology so I could become better at statistics, and so on, to help with the clinical research program.

I ran a research clinic at the Presidio in San Francisco for several years, and then the Army gave that up to the Department of the Interior and we lost our clinic. So, looking around for something else I decided to go into two new areas, bioceramics and calcified tissues. My current position is Distinguished Professor Emeritus, and Professor on Recall. We have this program where they recall faculty on a part-time basis, senior faculty, to help with teaching, and research, and things like that. So, I've been doing that for the last six years, and I think we're finished in July of this year.

When you reflect on your career, what were some of the key moments you're most proud of, and how did they help you drive to your success?

I think that I was always looking to solve what seemed to be an important but unsolved problem. And to take advantages of new opportunities, particularly with new technology. During my PhD I did a lot of transmission electron microscopy, and about the time I was finished scanning electronic microscopy was emerging. I got involved with dental research in particular with that, and it seemed like a fantastic way to look at tissues and things like enamel. Some of the early work I did on enamel, and then in amalgam and its corrosion products. So we coupled – as everybody else did – scanning electron microscopy and energy dispersive analysis and that led us to identifying some of the corrosion products in amalgam and some of the etching patterns in enamel. And also, kind of, tickled my interest in calcified tissues, which came back later when we started focusing on dentine.

It took us longer to find the right collaborator for bio ceramics, but we found him at Berkeley and we started working in bioactive glasses which are really interesting. We got patents on bioactive glass for hip implants, for example.

I'm very proud of a lot of the students over the years that I've had. I'm pleased to tell you that at the AADR in March, I got the distinguished mentoring award. So, I was very honoured to have that.

One of the key things is you have to find the right collaborators, and sometimes you have to go through a lot of people in order to find those right collaborators who both are interested,

Winner of the 2017 GSK IADR Innovation in Oral Care Award

Remineralizing Cement for Dentin Caries

talented, and are willing to put forth the real commitment in an area without necessarily the promise of an immediate reward.

Can you tell me, what does it mean to you professionally and also personally to win the GSK IADR Innovation in Oral Care Award?

Well, I was very pleased because for the past decade I'd been the principal investigator first, the principal investigator alone, and subsequently a co-principal investigator with additional people for the second five years on NIH grants that were designed to remineralise dentine. And I think we have made a lot of progress with our research and in artificial lesions have been able to restore many of the mechanical properties. We call this functional remineralisation – where demineralised dentine, due to perhaps caries, can be restored somewhere between 60 and 100% depending on how severe deterioration has been. And this is done in the labs without cells using a new technique called PILP which was developed by one of my collaborators at the University of Florida, Laurie Gower.

"I think that I was always looking to solve what seemed to be an important but unsolved problem."

She did it because she couldn't figure out how calcium carbonate shells were formed with such, kind of, incredible complex geometries, but they're calcified tissues. And so, she developed this thing to study calcium carbonates, and then we've extended it, and she's extended it to calcium phosphate materials. This is perfect for dentine because unlike enamel, which you can partially remineralise with fluoride, dentine is a collagen-based material like bone. If you just fill up the excess structure with mineral, precipitated by fluoride, you don't get the mechanical properties recovered. The PILP process allows calcium and phosphate ions to form into calcium phosphate inside the collagen fibres. If it is not inside the collagen fibres as well as outside then the properties of dentine don't get restored. It's just like leaving wet sand, and so when you press on it, it just skitters out of the way and there's nothing holding the structure together unless it's inside the collagen fibres as well. So, anyway, to make a long story short, we're really excited about this and about the progress we've made.

However this process takes from two to four weeks in solution, and that's a little bit long to have your mouth open. So, we're at the stage where we want to translate it into a clinically applicable treatment. So the idea was to make a glass ionomer material that contains, instead of the traditional glass ionomer materials, bioactive glass on one side and the PILP process on the other, and see if we can get a material that both sets and will provide some remineralization.

And so we tried this, and we're still working on it, and we've found that we can do this to a certain extent. So, that's what I would like to do now. I would like to make something that goes into the clinic, and that's what you allowed me to do since my ten years of NIH grants were about done. They're finishing this July. So, I was very pleased to have this as a way to continue my work and make sure that my collaborators are ready to carry it on into the future and hopefully we'll get something that eventually goes into the clinic and solves part of the problems of exposed dentine, carious dentine.

What advice could you give to other dental professionals or scientists considering entering this oral research arena?

The time has never been better in my opinion to think about entering the arena of oral healthcare research. There are some days when I wish I could start over – I think it's such an exciting time. Science has opened up and biomedical science has opened up so much that the opportunities in oral research have expanded. This makes oral health, as well as all phases of biomedical health research so exciting – there couldn't be a better time! So I would say, jump in with both feet. And find some good collaborators along the way, and some good mentors.

What does the future hold for you?

I will be fully retired next year and Professor Emeritus but I hope that my colleagues will continue to try and make our project work. Maybe not right away but somewhere down the line somebody's going to use this approach to really make a significant impact, I hope. And I hope we will have shown at least part of the way.

I plan to travel in the next few years. Both our sons are in San Francisco and so we spend time there. In fact one of them is coming on a cruise with us to Norway which will be fun.

We are expecting our first grandchild in July so we are looking forward to that! So we will be able to extend our sitting beyond our 'granddogs'.

"The time has never been better in my opinion to think about entering the arena of oral healthcare research. There are some days when I wish I could start over – I think it's such an exciting time."

Can you tell us something about you that's not on your resume that you'd like to share?

We are off to Alaska shortly – our fourth trip since 2011. We like the wildlife and we are planning to have breakfast with the grizzly bears in one of the national parks. Hopefully we won't be on the menu! We're focused on becoming purple noses, so we're going to work on that as much as we can, hopefully this summer. When you pass the Arctic Circle, you become a blue nose and when you when you pass the Antarctic circle you become a red nose. We hope to combine both!

Do you have a favourite song or piece of music?

If I had to choose a favourite song it would be Pilgrim by Enya. "One road leads to diamonds, one road leads to gold, one leads to, essentially, nothing except the things that you've been told". That songs speaks to the fact that you always wonder where you are going to go – my career has certainly not been anything like I expected it to be. The more I speak to other senior people in my career I find that we have all travelled strange paths to get to where we are.

Past recipients of the IADR GSK Innovation Award

2004 Recipients:

Jack Ferracane
John Mitchell, and Jack McCarthy, Oregon Health & Science University, Portland, USA
Novel Dental Desensitizing Agent Based on a Biomimetic Approach

Doron Steinberg
Amram Mor, Michael Friedman, and Gilad Bachrach, Hebrew University Hadassah School of Medicine, Jerusalem, Israel
Development of Pharmaceutical Technology for Sustained Release Delivery Systems of Antibacterial Peptides: The Effect on Dentla Biofilms and Oral Diseases

Spencer W. Redding
Jose Lopez-Ribot, H. Ralph Rawls, and Gregg Siegel, University of Texas-San Antonio, USA
Prevention of Candida Associated Denture Stomatitis

Marie-Claude Amoureux
Peter Grandics, Nandani Rajapakse, and Susan Szathmary, Clarigen Inc., Carlsbad, CA, USA
Binding of Quorum Sensing Molecules as Antibiofilm Strategy

2005 Recipients:

John Featherstone
Ling Zhan, Pamela DenBesten, Charles Hoover, and Stuart Gansky, University of California – San Francisco, USA
A Novel Antibacterial Approach to Reduce Caries in Children

Peter Holbrook
Thordis Kristmundsdottir, Halldor Thormar, and Skuli Skulason, University of Iceland, Iceland
A Novel Treatment for Cold Sores

Lin Tao
University of Illinois at Chicago, USA
A Novel Formula Protects Infants from HIV

2006 Recipients:

Hyun (Michel) Koo
Thomas Foster, and Robert Quivey, Eastman Department of Dentistry, University of Rochester, USA
A Novel Therapeutic Approach to Prevent Formation of Cariogenic Biofilm

Yen-Tung Andy Teng
Eastman Department of Dentistry, University of Rochester, USA
A Novel Therapeutic Human SCFV-Diabody For Aggressive Periodontitis

Cun-Yu Wang and Lijian Jin,
University of Michigan, School of Dentistry, USA, University of Hong Kong, Hong Kong
Targeting IKK/NF-KB For Periodontitis

2007 Recipients:

Toshihisa Kawai
Forsyth Institute, Boston, Massachusetts, USA
Noninvasive Gingival Delivery of FC-Conjugated Fusion Compounds

Fionnuala T. Lundy and David Orr,
School of Medicine and Dentistry, Queen's University, Belfast, Ireland and University of Ulster at Coleraine, Coleraine, United Kingdom
Characterization of a Novel Calcitonin Gene-Related Peptide (CGRP) Cleavage Enzyme

Gordon Ramage
Glasgow University Dental School & Hospital, Glasgow, Scotland
Improving Oral Care Using Tea Tree Oil and Its Derivatives

2008 Recipients:

Urban Hägg
Lakshman Samaranayake, Richard Kao, and Michelle Yuen, The University of Hong Kong, Hong Kong
A Natural Edible Agent for Reduction of Oral Biofilm

Keith Kirkwood

Medical University of South Carolina, USA

Targeting Post-transcriptional Signaling for Periodontitis

David T.W. Wong

Wei Lao, and Fang Wei, University of California, Los Angeles, USA

SPITDX: A Universal Platform for Salivary Biomarker Detection

2009 Recipients:

Rena D'Souza

Baylor College of Dentistry, Texas A&M Health Science Center, USA and co-investigators Jeffrey Hartgerink, Departments of Chemistry and Bioengineering, Rice University, Houston, Texas and Gottfried Schmalz, University of Regensburg, Germany

Nanostructured Peptide Hydrogels and Stem Cells for Dentin-Pulp Complex Regeneration

Eric Reynolds

Melbourne Dental School, The University of Melbourne, Australia and co-investigator Stuart Dashper

Development of Oxantel to Prevent Periodontopathogenic Biofilm Formation

Sandra Bordin

University of Washington, Seattle, USA and co-investigator Xingde Li

Optical Coherence Tomography for Non-Invasive Diagnosis of Periodontal Disorders

2010 Recipients:

Robert Patrick Allaker

Queen Mary & Westfield College, University of London, UK and co-investigators Jie Huang, Department of Mechanical Engineering, University College London and Guogang Ren, School of Aerospace, Automotive and Design Engineering, University of Hertfordshire Hatfield, UK

Multifunction Nano-biomaterials for Implant-based Dental Reconstruction Products

Daniel Grenier

Groupe de Recherche en Ecologie Buccale, Université Laval, Quebec, Canada and co-investigator Francesco Epifano, Faculty of Pharmacy, University G. D'Annunzio of Chieti-Pescara Chieti Scalo, Italy

Therapeutic Potential of Citrus Auraptene for Periodontal Disease

Craig Miller

University of Kentucky College of Dentistry, Lexington, USA and co-investigator Jeffrey L. Ebersole

POC Immunoassay Test Strip for the Diagnosis of Periodontal Disease

2011 Recipients:

Scott DeRossi

Medical College of Georgia, Augusta, USA and co-investigators Douglas Dickinson, Stephen Hsu, Stephen Looney and Kalu Ogbureke

A Natural Formulation for Patients Diagnosed with Xerostomia

David T. Wong

University of California, Los Angeles, USA

SCPSS: Enabling Technologies for Salivary Biomarkers for Clinical Applications

Hui Wu

University of Alabama at Birmingham, USA and co-investigators Suzanne Michalek and Christian Melander (North Carolina State University)

Development of Small Molecules that Inhibit and Disperse Carciogenic Biofilms

2012 Recipients:

Simone Duarte

New York University, USA and co-investigators Deepak Saxena and Nelson Silva

The Influence of Low-Temperature Plasma on Biofilms

Christopher Irwin

Queen's University, Belfast, Ireland and co-investigators Fionnuala Lundy and Brian Walker

Peptide Mimetics of LL-37 as Novel Therapeutics for Periodontitis

Doron Steinberg

Hebrew University, Jerusalem, Israel and co-investigator Michael Friedman

Novel Sustained Release Varnish of Anti-Biofilm/Anti-Quorum-Sensing Agents Against Oral Biofilms

2013 Recipients

Marlise Klein
University of Rochester, New York, USA and co-authors, Danielle Benoit, Hyun Koo and Megan Falsetta Wood
Controlled Release in situ of Antibiofilm Agents via PH-activitated Nanoparticle-Carriers

Bernhard Ganss
University of Toronto, ON, Canada and co-author Eli Sone
Novel Peptide Mimetics to Reinforce Dentogingival Attachment

Dong Wang
University of Nebraska Medical Center, Omaha, USA and co-author Richard Reinhardt
Dentotropic Pluronics as Novel Formulation Excipients for Oral Hygiene Products

2014 Recipients

Keith L. Kirkwood
Medical University of South Carolina, Charleston, USA and co-author Frank Alexis of Clemson University
Novel Anti-Inflammatory Nanoparticle Scaffolds for Periodontal Treatment

Yvonne Kapila
University of Michigan and co-authors J Fenno, and Alexander Rickard
The Effect of Nisin on Dental Plaque Biofilm Communities

Jake Jinkun Chen
Tufts University and co-authors Qisheng Tu and Lily Dong
A New Therapy for Treating Diabetic Periodontitis

2015 Recipients

Lizeng Gao
University of Pennsylvania, Philadelphia, USA
Biofilm Elimination and Caries Prevention Using Biomimetic Nanoparticles

Janet Moradian-Oldak
Herman Ostrow School of Dentistry of USC's Center for Craniofacial Molecular Biology, Los Angeles, California, USA
Repairing Tooth Enamel with Chitosan-Amelogenin-based Hydrogel

Alireza Moshaverinia
Herman Ostrow School of Dentistry of USC's Center for Craniofacial Molecular Biology, Los Angeles, California, USA
Regenerative Treatment of Peri-implantitis using Mesenchymal Stem Cells

2016 Recipients

Catherine Ovitt
University of Rochester, New York, USA, and co-investigator Vyacheslan Korshunov
Localized Delivery of Amifostine to Enhance Salivary Gland Radioprotection

Nicholas Jakubovics
Newcastle University, Newcastle Upon Tyne, England, UK, and co-investigators Michael Hall, Philip Preshaw and Grant Burgess
Control of Oral Biofilms using a Natural Marine Microbial Enzyme

H.M.H.N. Bandara
University of Queensland, Australia, and co-investigators Lakshman Samaranayake and Hugh David Charles Smyth
Novel Quorum Sensing-based Liposomal Drug Delivery Against Oral Candida Biofilms

2017 Recipients

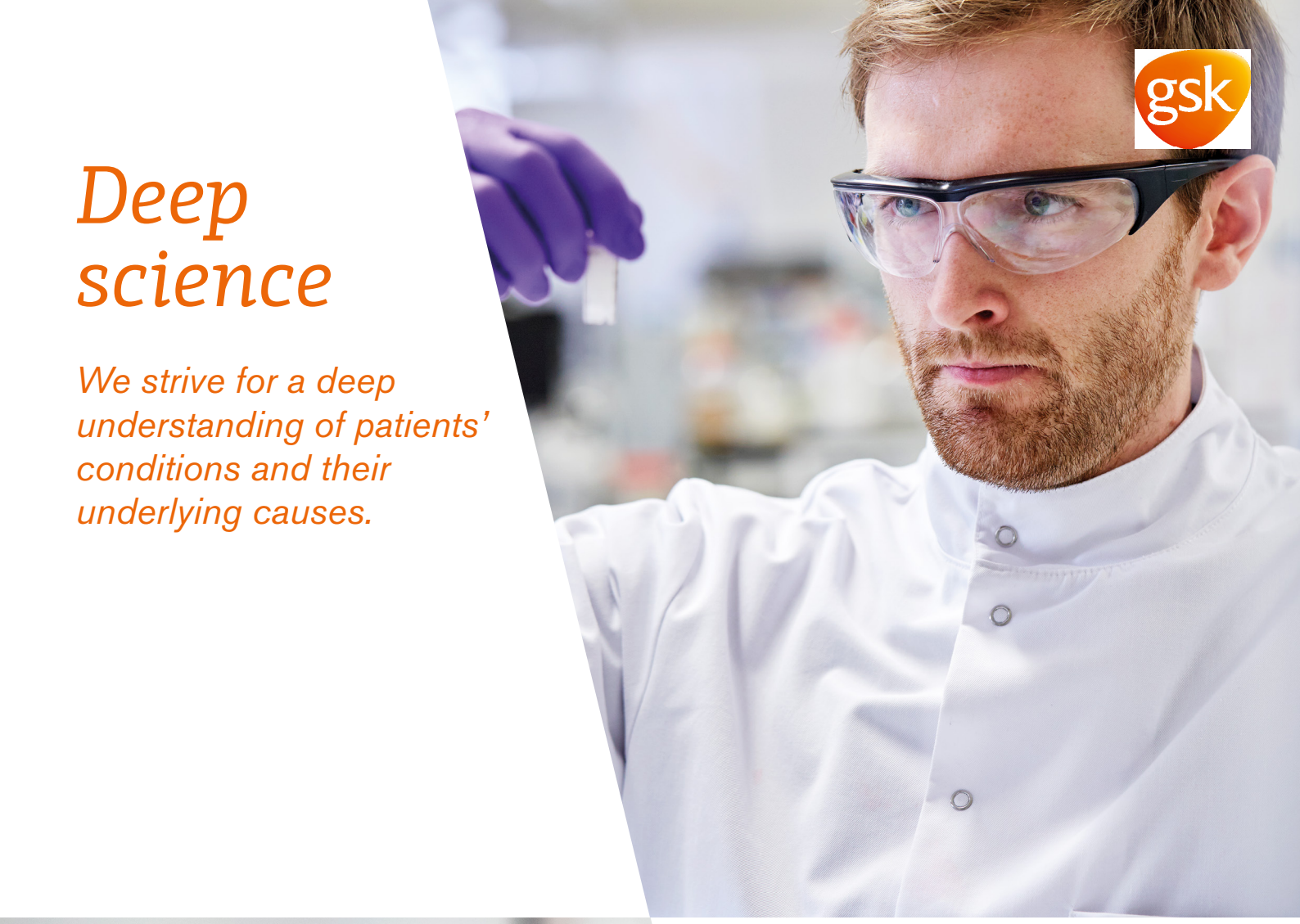
Mikako Hayashi
Osaka University, Osaka, Japan, and co-investigators Takayoshi Nakano, Osaka University Graduate School of Engineering, Japan, and Reo Uemura, Osaka University, Osaka, Japan
Riboflavin-UVA Treatment Prevents Root Caries by Promoting Collagen Crosslinking

Grayson Marshall
University of California, San Francisco, USA and co-investigators Stefan Habelitz, Sally Marshall and Kuniko Saeki
Remineralizing Cement for Dentin Caries

Petros Papagerakis
University of Saskatchewan, Saskatoon, Canada and co-investigators Nikos Chronis, University of Michigan College of Engineering and Silvana Papagerakis, University of Saskatchewan, Saskatoon, Canada
Intra-oral Device to Measure Time-dependent Saliva Biomarker Levels

Deep science

We strive for a deep understanding of patients' conditions and their underlying causes.



Precision solutions

That's why we create solutions tailored to patients' needs. Not one size fits all