

raft

HIGHLIGHTS

Survival at 700 degrees / Bionic trials / Smart Matrix™ moves forward

2010/11



First class quality

I am immensely proud to have Chaired RAFT over the past year. Indeed it has been a difficult year for all charities and the next few years are set to challenge us all. However, RAFT has survived and will continue to survive because of its true professionalism in all that it does. Forward planning has been to key to a successful year; the team has focussed on costs and innovating the way it fundraises without ever compromising the quality of the research. Your support, however, remains as important, if not more important, than ever.

In addition to its science innovation, RAFT is also innovating the way it supports its science. RAFT's mission has always been to get research to patients, but not to fund clinical trials. Hence it is setting up a philanthropic biotech company to take on the next phase of the development of the basic Smart Matrix™. Although pre-clinical trials have been successful, the setting up of the biotech company will remove any risk to the Charity. More details on this will be announced shortly and do let us know you might be interested in knowing more about the separate biotech company, to be run on normal venture capital commercial lines. This will now free RAFT to get on with other pressing research such as a more sophisticated Smart Matrix™ for military wounds and leg ulcers as well as our 'bionic limb' project.

The quality of RAFT's research remains first class. More of which you will read about in the following pages.

Thank you for your support over the past year. I hope we can count on your continued support for the year ahead.

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Thank you so much

I can't believe it's been a year since I sat down to write my personal message for the RAFT Highlights. However, it has given me the opportunity to take a few minutes to sit back and reflect on what has been a tremendously busy and productive 12 months – which you will read about in this publication.

As Chief Executive, I am responsible for the day to day running of the Charity. I won't hide the fact that one of my main concerns at the beginning of the year was how the economic climate would affect our fundraising. Although it is my job to worry, I should have known that our loyal friends and supporters wouldn't let us down. We have simply been blown away by how generous you have all been. The team and I cannot thank you enough for jumping out of planes (with parachutes, of course), running marathons, cycling unthinkable distances, nominating RAFT as your company's 'chosen charity', instigating donations from your Trusts & Foundations..... the list just goes on and on.

Your overwhelming support has allowed RAFT to achieve so much this year. For example, you have enabled us to get the Smart Matrix™ one step nearer to patients. We really couldn't have done it without you.

Our thanks also go to firefighter Richard Richards, who you will have seen on the cover of this publication, together with the other patients who have so kindly allowed us to print their very personal stories. At RAFT, we only carry out research that will improve treatment for patients in the quickest possible time. It is always so helpful, therefore, to keep in regular contact to make sure that we are getting it right.

I do hope that we can count on your support for the year ahead. It is going to be an exciting year for RAFT and we are honoured to have you on board. As Christmas is fast approaching, we would be thrilled if you would consider adding RAFT to your list – a donation would be very gratefully received.

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Manufacturing of Smart Matrix™ to begin



You look at the material in front of you. The whitish square, about 80mm by 80mm, looks like skin. You pull on a pair of purple gloves and feel it. The stretch, texture and feel are just like skin and you can't help but smile. RAFT's Dr Julian Dye catches your excitement. "It's really amazing stuff," he says.

After seven years of tough research and a strong belief in the validity and need, Smart Matrix™ – RAFT's artificial skin scaffold – is now ready to be turned over to a clinical manufacturer to be produced under strict regulatory controls. Patient trials will then be just around the corner.

Julian has had the first meetings with a Sheffield-based manufacturer and RAFT has begun detail planning on how RAFT will transfer over workbench technology to the company.

"We're really excited that we're at the stage where we can hand over our plans to a manufacturing plant," says Julian.

"This approach has taken us a bit longer but we will benefit in the end," he says. "We need Smart Matrix™ made under a regulatory framework which RAFT does not have – we're a research laboratory, not a manufacturing plant. The government will scrutinise every aspect of the manufacturing process; it's very stringent and very expensive to do."

However, because the Sheffield plant is licensed to manufacture items in the strictest of conditions, Smart Matrix™ produced there can be supplied for patient trials anywhere. This will greatly simplify the whole process and hopefully get it to patients faster.

"In pre-clinical trials with experimental wounds, Smart Matrix™ has integrated into the wounds exactly as we were hoping it would," says Julian. "This provided us with more evidence of the reliability of Smart Matrix™ being able to in a single step restore a full thickness of skin."

According to Julian, as part of the procedure in developing a manufacturing process, a used freeze dryer was bought to aid in drying Smart Matrix™. But in what has proved to be a case of serendipity, the process has helped produce artificial skin looking and feeling like real.

"With the old method of producing Smart Matrix™, the product was quite brittle," says Julian. "Although once soaked in a sterile solution the older Smart Matrix™ would be fine, the new freeze dried version is easier to handle in the operating theatre and is more surgeon friendly."

Why Smart Matrix™?

Skin, the largest organ in the body, can suffer wounds that are difficult to treat and heal. Burns and skin ulcerations in particular can challenge any doctor and can easily lead to premature death.

Although the outer layer of the skin (the epidermis) can respond to treatment – such as skin grafts – the tough, thick inner layer of skin (the dermis) does not reform during the healing of a full thickness wound.

In addition, due to the amount of burns someone suffers, there might not be enough undamaged skin left for grafts. The use of donor skin taken from a cadaver is one alternative but the body will reject

this after about three weeks. This short period might not be long enough for new skin to grow.

The healing of all deep skin wounds is slow, allowing for a vicious circle of infection and inflammation to begin, which at best can lead to scar tissue, but at worse can lead to death.

Smart Matrix™ is an artificial skin scaffold which encourages rapid growth of blood capillaries when placed into a wound bed in the dermis. Much like how a scaffold supports the work around a home's roof repairs, Smart Matrix™ also provides a scaffold, giving the body something to regenerate new skin around.

During the wound healing process, Smart Matrix™ attracts cells into the matrix and promotes the growth of blood capillaries which is critical for the wound healing process. The scaffold is completely reabsorbed by the body within three weeks, by which time wound healing should have occurred.

Smart Matrix™ has the potential to become a new standard-of-care in the treatment of a variety of full thickness skin wounds. These include combat injuries, burn wounds and chronic wounds, such as diabetic ulcers and pressure sores.

Current artificial products are costly and surgeons tell RAFT that they are not as effective or robust as needed.



Dispassionate impossibility

While as a scientist I need to maintain dispassionate objectivity, I am now thrilled that we have begun working with a manufacturing company to set up a pilot Smart Matrix™ production process for its first clinical use.

The Smart Matrix™ is a type of artificial skin scaffold which has been designed to integrate very rapidly with wounds where there is a complete loss of skin tissue.

The initial motivation to pursue the idea of a 'Smart Matrix™' was hearing from Plastic Surgeons about the clinical limitations and failures of existing products. However, it was witnessing the reality of what patients needing surgical skin reconstruction undergo, and talking with patients who had survived and endured prolonged suffering from wound infections, made me appreciate the urgency of this need, and continues to spur us forward.

It is so important to re-double our efforts as we come closer to clinical use. Over the last year our team has been working hard in the laboratory at RAFT on refinement and answering important questions about how to manufacture the Smart Matrix™ in a clean room, how to set quality standards, and turn a laboratory method into a robust manufacture process. All together, we have optimised the production process and improved the product - the Smart Matrix™ now handles and 'feels' like a surgical material.

Maintaining objectivity is crucial, but as we draw tangibly close to finding out whether translating the Smart Matrix™ idea into reality that will actually help to rebuild lost skin for patients in desperate need, I cannot help but feel excited.

Dr Julian Dye



Luke Skywalker's bionic limb is beginning to become a reality.

Turning a dream to reality

In the classic Star Wars movie *The Empire Strikes Back*, hero Luke Skywalker's arm is severed and amputated during a light saber fight with Darth Vader. But this doesn't slow down young Luke who is fitted with a bionic arm that he can use like his own. When this film came out in 1980 bionic limbs were pure science fiction. However, each day RAFT is getting closer to making this a reality.

There is a certain buzz you get when you talk to Dr Yazan Al Ajam who heads RAFT's prosthetics project. Teamed with Professor Gordon Blunn, Dr Catherine Pendegragh and Dr Steve Taylor – all with University College London – and RAFT's Mr Norbert Kang, you start to realise that what once sounded like a pipe dream is going to happen.

Yazan makes a slight face when you voice this. "Yes, it really does seem like you can see the light at the end of the tunnel, but with this being new research, there are things which can go wrong which at this stage it's hard to foresee."

"But...", you say.

And then Yazan smiles. "But yes, it is looking good."

What RAFT's bionic limb project is about is this. Plain and simple, artificial limbs have not radically changed in over 3,000 years,

with little change over the last 500. While someone might say that this demonstrates modern artificial limbs come from a proven and effective design, nothing could be further from the truth.

Because they are uncomfortable to wear and bring little benefit to the patient as far as usability, the vast majority of prosthetic wearers stop wearing one within two years of being fitted. RAFT – along with other independent groups – is struggling to overcome this problem by providing amputees with an artificial limb that is comfortable to wear and actually works; duplicating the actions of a real limb.

What in part is driving this need is advances in military medical aid: soldiers whose combat injuries would have once proved fatal are now being saved. However, the downside of this success is that many of these wounded soldiers have lost one or more limbs.

Two challenges

Yazan says that there are two challenges to overcome; the first is attachment so the limb doesn't cause chaffing, itching, pressure and pain; and the second is movement.

"There have been excellent recent developments in making artificial limbs

which use a skeletal fixture. Called Intra-Osseous Transcutaneous – or ITAP for short – it attaches to the bone and leaves the skin, much like how an antler leaves a deer's body," he says.

The limb can easily clip on and off this permanent attachment and, because the limb is not resting against the body, there is no chaffing. While this has addressed the problem of attachment, there remains the problem of control.

There are two methods which researchers are considering but, as of so far, both ways have met with only limited success.

The first method places sensors on the outside of the skin and above the stump, which can detect muscle movement under the skin. Sensors convert this into an electric signal and transfer the information to miniature motors inside the artificial limb, allowing motion to take place. "But the problem with this method is that it is too limiting," says Yazan.

Natural hand movement relies on a multitude of contracting muscles to move fingers and wrist – the forearm alone has 32 muscles responsible for hand and wrist movement. However, sensors placed on the surface of the skin cannot distinguish

between the individual signals coming from these separate muscles as they contract; they can only detect 'mass-action' contractions responsible for opening and closing the hand.

As a result, most of these systems make do with only two sensors and at best can only duplicate crude hand movements. Manufacturers have attempted to address this shortcoming by using mode switch commands to change from one movement (hand open and close) to another (wrist rotation). While this represents an improvement over previous designs, it is unintuitive and requires a great deal of re-learning how to control the limb.

The other approach being tried is to go internally and place sensors directly into the muscle. In the USA a project funded heavily by the government appears to be successful using this method. However, there are limitations with it, due in part to the sensors' extreme high-tech construction.

As with all of these projects, one of the keys is trying to figure out a way to transmit the electrical impulse from the brain to the artificial limb. The sensors being used in the US project are very sophisticated and not passive; meaning that they will require a power source. In addition, due to their complexity there are more possibilities for things to go wrong and they might require scheduled replacement.

"For me, I want this project not to be confined to state-of-art hospitals in the US or Europe but to be simple enough so that surgeons in developing world countries will be able to benefit their patients," says Yazan.

"My project will use passive sensors. They are much simpler in design and should be far more robust and longer lasting."

The sensor package, which is available already off the shelf, comes with two sensors placed near each other inside an electrode. Due to the slight separation between the two sensors, they can detect a difference in electrical charges as the electrical signal travel through the muscle.

In seeing what other companies are doing in regards to the detecting a signal, Yazan sees many advantages with the RAFT project. "Looking at just the sensor itself, there are no moving parts, no serviceable parts; just an inexpensive reliable solution to the problem."

Funding needed

Despite all the successes so far with the bionic limb project, it is easy to detect a sense of frustration in Yazan's voice.

Part of this is due to the amount of time needed before RAFT's bionic limb can actually be in a hospital ready for use.

When asked to give a deadline, he says up to ten years.

"More funding would make that much difference," he says. As it is, Yazan is the only one working fulltime on the project. With other people assisting, this time frame can be potentially halved.

The other problem which gives Yazan's sleepless nights is he knows the number of people who are counting on this being successful.

RAFT receives offers from people willing to be human guinea pigs – there is that much desperation felt by amputees. However, science is based on correct data, which predicates further data. Steps have to be followed and the process cannot be rushed.

"RAFT does not have the funding or facilities to do a big major test with this project, which is why I'm working very closely in collaboration with others," says Yazan. "For example, I have access to all the necessary expertise offered by UCL – the same team that developed ITAP. Without these others, this project would have never got off the ground."

With the initial pilot tests underway, Yazan can start to taste success. But as a researcher, he knows the unexpected can always happen.

"It is crucial that we build up on our current findings and keep refining our design and make it a success," he says. "Our data is good; we're on the right track."



Dr Yazan Al Ajam at RAFT examining a prosthetic limb made by Otto Bock.



An ITAP placed in a patient.

Pushing the boundaries of skin cancer



Dr Nick Kassouf

Because of the minute nature and complexity of cell biology and DNA, it's difficult for most of us to grasp the significance of Dr Nick Kassouf's research into free radical cell damage. But to make a like-comparison in the astronomical scale, it's as if Nick has pushed back the accepted beginning of time from a universe already being here, to the Big Bang.

What will this mean? Nick's research into establishing a time-line when free radical cell damage actually begins – which needs to stand up to a final review by his peers – will open up a completely new way of thinking about skin cancer and how it can be prevented.

"What will other scientists think about this?" says Nick. "Jaws will drop."

According to Nick, almost all of free radical research is not cell based but instead looks at the process from a chemical or physics view. RAFT, however, is one of the few research groups linking a very chemical/physics process with something that is cell biology.

"People have been looking at the results of cell damage, but not where it starts," says Nick. "The research we've done at RAFT has pushed back the starting time for this damage by two to three steps. We don't think there is anything beyond this."

Nick's research is centred on melanin which, besides having a role in protecting skin from sunlight, might also have a sinister side in increasing the amount of skin damage when it is not produced in sufficient amounts to form a thick protective layer over skin cells.

What RAFT's research, led by Dr Rachel Haywood, has shown so far is that people with low or high amounts of melanin in their cells experience less cell damage than those with only a moderate amount when exposed to UVA light.

How and when free radicals play a part in damaging DNA and allowing skin cancer to start is the driving force behind's Nick's

work. By knowing these facts, skin cancer may be prevented.

"Skin cancer is like a big jigsaw puzzle with many different pieces and with many different people looking into these

parts," says Nick. "The DNA piece could well be one of the most important parts of the puzzle."

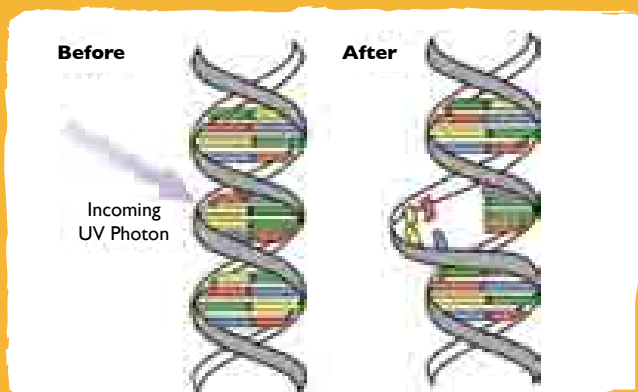
Armed with this information, sun screen manufactures would be able to make more effective products for the prevention of skin cancer.

Free radicals are minute chemical particles (atoms or groups of atoms) which are frequently the by-products of chemical processes. Free radicals have at least one unpaired electron, causing the chemical particle to be unstable.

Free radicals 'chip' away at cell walls, molecule by molecule, making holes. The cells leak and lose their chemical balances. Subsequent free radicals are able to chip away at DNA, making cells dysfunctional. Nick says that because this could be the basis of normal cells transforming into cancerous cells, RAFT plans to carry out work in the future here.

"We're pretty confident of our research but we need two experts in the field to go over our work. They'll challenge any weaknesses or uncertainties they find," says Nick. This process has already begun.

"RAFT is already seen as the expert in this field. These findings should open up more collaborations with other research groups."



Sunlight can affect the DNA structure of cells.

High marks from students



Twenty-year-old Kwame Asiedu is honest. He had absolutely no idea what RAFT was when he saw it listed on the Queen Mary University's student forum website for summer placements.

"The name...yeah...it doesn't really tell you what it's all about," he says laughing. Still, intrigued he went to the RAFT website, liked what he saw and applied for an eight week placement.

"Kwame in some ways was not the best candidate for a placement at RAFT. His degree programme at Queen Mary is in engineering, not biology," says RAFT Chief Executive Leonor Stjepic. "But there was something about him which made him stand out."

"With some placements, you spend your day making coffee and running a copier," says Kwame. "But RAFT was different. Everything you do here benefits RAFT, even if experiments go wrong, there is a benefit. In science a negative can be a positive if it helps move the research forward."

"The most challenging thing I did here was work in the lab. There are so many different techniques and ways of approaching a project. I've never worked before in a lab clean space and you have to be constantly aware that if you're not careful, you can bring contamination into a project."

Although he and the other interns were given a timetable to keep them on track,

Kwame says he soon learned an important fact. "You can't plan science. Because what you're doing is new research, things don't always turn out the way you thought they would. Problems happen, and sometimes you have to step back and take a different approach."

What he found to be the most surprising at RAFT wasn't in the lab but in the lunchroom. "At RAFT you have research scientists and fundraisers. You'd think that this would be a pretty awkward combination of people who would have nothing in common. But during lunch, they all eat together, work on a crossword puzzle and talk. It forms a close team."

Intern – now staff

Niroshehaa Raganathan started in a summer intern position and now works for RAFT, working first for Dr Nick Kassouf and now with the Smart Matrix™ team.

"Nick is easily the best and most patient teacher I have ever had the privilege of

studying with," says Niroshehaa. "Before I started here, I didn't have much belief in my own abilities, but I have received nothing but encouragement and good advice.

"The most amazing thing about working with such a small group is the atmosphere; people here are so intelligent, hard working and passionate about what they do," she says.

Qualities RAFT wants

"What makes a good student at RAFT?" says Dr Nick Kassouf.

"Enthusiasm. They have to have enough confidence to ask questions, to be hard working, but enthusiasm, I really look for that."

In a given year Nick will work with up to four students. If body language is a clue, then it's a job he relishes.

Nick starts students off with fundamentals and protocols, teaching them an exact way of doing things. "Students need to understand the protocols, which gives them the flexibility to make changes as things require.

"Anyone can follow a recipe, but unless you understand why it comes together as it does – the protocols – can you make changes and adapt when things go wrong," says Nick. "It's like being a chef, you can't always expect to make a recipe exactly the same way, spice flavours will vary but it's only understanding the recipe can you adapt."

Students all describe Nick as having endless patience, which he shrugs off. "I just remember being a student, I remember making mistakes – I still make them. You can't let the fear of making one hold you back."



LLC and RAFT tackle leg ulcers



Leg ulcers can be difficult to treat, leaving a sufferer to feel that their leg is being eaten away.



RAFT and the Lindsay Leg Club Foundation are both working hard to treat and cure problematic leg ulcers.

Leg Clubs are a community-based alternative to the treatment usually provided by district nurses for people with leg ulcers and other leg-related problems. Individuals can either be referred by their GP or they can simply turn up to a Leg Club – no appointment is needed. The Lindsay Leg Club charity was set up to support these growing numbers of Leg Clubs in the UK.

Leg Clubs encourage their members to become involved in their own treatment and care and to share their experiences with fellow members. This psychosocial element adds a dimension that is often missed in traditional care. Research has shown that the Leg Club approach makes a significant contribution to improved healing rates.

The Leg Club Foundation, together with its industry partners, is at the forefront of education and research into lower limb problems including leg ulcers. Last year it launched the Leg Club Learning Zone (www.learningzone.legclub.org). This is an innovative online educational programme designed to give all Leg Club members access to a fountain of knowledge.

A recent development that Leg Club founder Ellie Lindsay is particularly enthusiastic about is the partnership with RAFT. The two charities will be working together to improve the treatment and quality of life for patients with leg ulcers.

Ellie said: "This partnership comes at an exciting time for both charities and our combined strengths will inevitably go a long way to improving leg ulcer treatment."

This year marked the 11th year of the Leg Club Foundation's annual conference. This has become a highly-regarded event in the wound care calendar with sessions run by some of the top clinicians in the country and throughout the world coupled with practical workshops. It brings Leg Club nurses, volunteers and clinical nurse specialists together to share best practice and to learn about the latest techniques and clinical innovations in the management of leg ulceration. RAFT took a stand at the conference and members of the RAFT team were delighted with the interest shown by delegates.

To find out more about the Leg Club Foundation visit: www.legclub.org

Living with a leg ulcer

Degrading; smelly; unglamorous; these are just a few of the words that Mary-Rose Fawkes uses to describe the leg ulcer which not only threatened her leg, but led to a lack of personal confidence and depression.

Mary-Rose was helping her daughter move and she accidentally slammed the car door on her own leg. Because the wound was triangular in shape, doctors could not stitch it so they tried dressings for two months, hoping it would heal.

"After eight weeks the nurse told me that the wound was getting better, but because I was a nurse I knew it wasn't," she says.

During the treatment she was unable to have a bath or shower in a normal way. The pain was so severe at times that it could only be alleviated by analgesics and sitting with her leg elevated, serving to draw attention to herself when she went out.

"Imagine how it feels to see one's leg being eaten away by a seriously weeping wound which does not heal at all, whatever dressing is applied," she says. "I was now frightened. The future of my mobility was looking bleak.

"It was also most debilitating to know that one 'smelt' and therefore likely to be offensive to other people. All in all, living with a leg ulcer is like being a leper in public and an unattractive ailment in private. It isolates; it depresses."

Mary-Rose was lucky that a nurse recommended the Lindsay Leg Club in Worcester as a last resort to try and get the ulcer healed.

"The nurses gave me a test to make sure my circulation was good enough to have a pressure bandage applied, so that healing could begin from the base and not from the surface," she says. "The pressure bandage was re-applied regularly and within eight weeks my leg ulcer was healed.

Blessed relief! I now have my life and legs back again."

RAFT and the Lindsay Leg Club Foundation share the same aim – to provide a better quality of life for patients with leg ulcers.

Clay pigeons and records broken at shoot

All stops were pulled out for this year's RAFT Clay Pigeon Shoot which raised just short of £100,000, beating all previous records.

Besides raising this staggering amount, a new record was also set for the number of teams participating which this year reached over 40.

The shoot supports The Alan Gaynor Research Fellowship which was set up by Patricia Gaynor and her family after Alan's tragic death 10 years ago in a fire.

The Fellowship Fund has supported many Surgical Research Fellows giving essential clinical input to the success of the Smart Matrix™ project. Project leader Dr Julian Dye says that RAFT really values its special relationship with Patricia and the Gaynor family.

"Without their continuing support and commitment, we would not have achieved all that we have." He says.

The event caters for all shooting abilities from novice to expert. After a morning of shooting, the teams break for lunch with fine wines. A live and silent auction is held during this time.

"Besides being a fun day out, I do a lot business here," said one participant. "You can feel good about yourself, what you're doing and who you're donating money to, while being in a perfect networking environment."

Why not join us at the 2012 charity shoot on 20 June at Holland & Holland? Contact Christine Miles on 01923 844371 or email her at miles@raft.ac.uk





Nadia Faber held a boys leg waxing event at her school to raise funds.

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RAFT's Commu



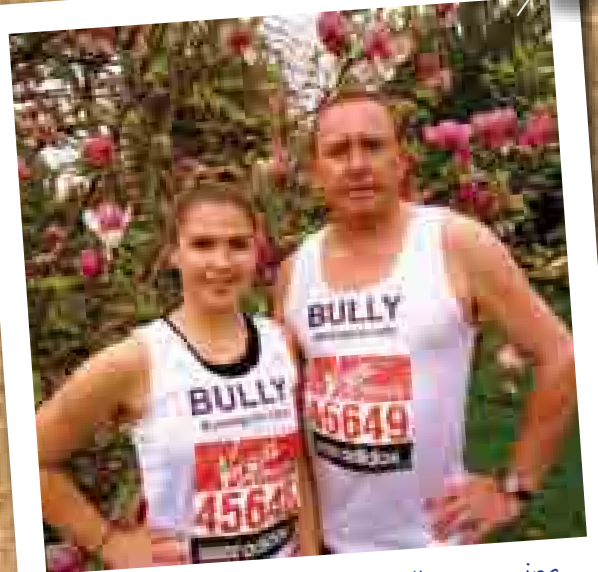
Cycle of Life Bike Challenge saw a team of four who rode from John O'Groats to Landsend.



RAFT Chief Executive Leonor Stjepic at the Hospital Saturday Fund Presentation.



RAFT's team drawing interest at the Duke of Edinburgh's Award Expo.



Father and daughter marathon running team Nick and Sarah Bull before ...

Community Fundraisers!



Fire fighting team cycled the Trans Pennine Trail Challenge for RAFT.



Afford Silver Band held a concert for RAFT in October.



Gabie Calamatta at RAFT's Taste of the Vine evening.



... and after the Virgin London Marathon.

A BIG THANKS TO ALL!

RAFT would like to thank all of you who over this past year have ran, baked a cake, climbed peaks, waxed legs, sipped fine wines and had the indignity of having lasagne thrown at them while cycling, all to raise funds for us.

Our research is expensive, and we rely on the fundraising efforts of our supporters. Without the help of people like you, we simply wouldn't be able to continue our work.

Superheroes needed here!



(tights not required)

You may be thinking about doing The Duke of Edinburgh's Award. Great, this shows you have outstanding courage, fortitude and the ability to text faster than a speeding bullet.

But young hero, now you need to find a quest – otherwise known as completing the Volunteering phase of the Award. May we suggest the wound healing charity RAFT.

Around the world, the lives of hundreds of thousands of people are affected by skin disfiguring illnesses such as skin cancer, and damage from burns, wounds and skin ulcers. By helping to raise funds for RAFT's vital research you will help to make a real difference.

Here are some ideas for your mission:

- Do a sponsored jump out of a plane
- Have a cupcake sale
- No uniform day
- Leg wax the hairiest boys in class
- Climb a mountain
- Organise a dance

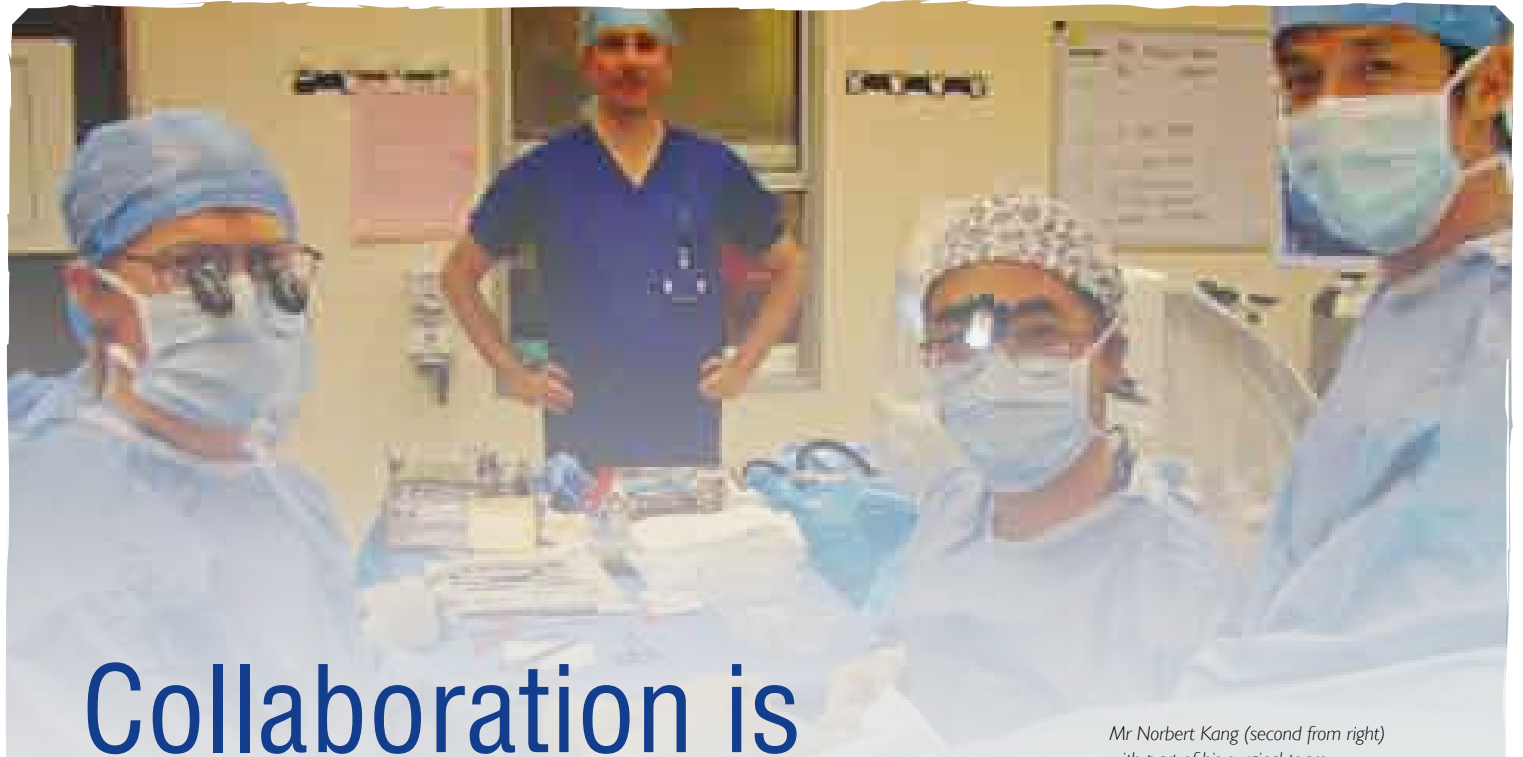
Race against friends to see who can eat the most baked beans with chopsticks.

Use your imagination or go to the RAFT DofE website for more ideas.

All that is left is for you to choose an activity you'd enjoy, from the fun to the crazy. Our team at RAFT will be happy to guide you along every step of the way.

So Superhero, the only question left is: how far are you willing to go for RAFT?

www.raftdofe.co.uk



Collaboration is the name of the game

Mr Norbert Kang (second from right) with part of his surgical team.

You've all seen it either in a picture, a copy – or if you're lucky – the real thing in Musée Rodin in Paris. The nude male statue sits out in a garden, chin on hand, elbow on knee: *The Thinker*. It is perhaps the purest representation of human inquiry – the lone, stoic coming up with every answer by himself.

While we might admire the idea of the solitary, creative process – the scientist alone late at night in her laboratory; the composer surrounded by hundreds of crumpled-up pieces of sheet music – the reality is most times something quite different for the simple reason that two heads **are** better than one.

"Collaboration is the name of the game; it's good for science," says Mr Norbert V Kang, RAFT Research Advisory Committee member and consultant plastic and hand surgeon at the Royal Free Hospital.

"Working with someone else means there is less chance of reinventing the wheel."

RAFT was started 23-years ago by four consultant plastic surgeons who all shared a passion for supporting research and education in the fields of reconstructive plastic surgery and burn injury treatment. They were all used to working as part of a

surgical team; to sharing information and to looking elsewhere to make up the gaps in their own knowledge. Because of this, RAFT has always built its research on collaboration.

"At RAFT we do a lot of collaborations. With every project I ask the researcher: who are you going to collaborate with?" says Mr Kang. "In fact, some grant givers won't give you money unless you are in collaboration with someone."

He says that this is good news for donors. By working with another research group, RAFT has access to expensive test equipment that it doesn't have to buy for one-off use.

In addition, by working with another team there is the potential to access all of their resources, test equipment and previous work. In theory, RAFT can be twice the size with the right collaborator.

A good example of an ongoing collaboration is RAFT's bionic limb project, in which Dr Yazan Al Ajam is working closely with University College London (UCL) Centre for Biomedical Engineering.

Yazan is hoping to develop an artificial limb which will be controlled directly by sensors located inside the existing muscle above

the amputation. Muscle impulses will leave the muscle and travel to the prosthesis via a metal implant.

While Yazan is spearheading the project, some of it – such as designing the actual physical equipment parts – is beyond his area of expertise, which is why he is working so closely with UCL. Once this is accomplished Yazan says that the design will be taken to Finetech Medical, a firm with experience in manufacturing electrodes. It will then make the actual sensors.

As talented as Yazan is, he will be the first to admit that if the entire project was completely on his shoulders, it would be impossible to complete. By bringing in other experts, however, this fantastic idea might well become a reality.

"There are a lot of great ideas out there: if you collaborate there is a much greater chance of finding them," says Mr Kang.



Inside the inferno

Left: London firefighters tackle a blaze. © LFB

He was with the 2nd team of firefighters; they got the word to go inside and join the 1st team.

"The upstairs floors had been converted into bedsits; it was really confusing inside and real hard to get your bearings," he says. Still, they were there to do a job.

However, once it was determined that all residents were safe outside, 1st team radioed to the others to get out.

"We started moving towards the stairs. The smoke was thick; real thick and it was all pitch black," says Richard. "Even with a torch, you couldn't see a hand in front of your face."

The 2nd team started to head for the stairs but ran into an unexpected obstacle. The 3rd team had tried to move a bookcase, but it fell apart in their hands and it now blocked the stair well.

"My recollections are a bit hazy, but I remember starting to get hot, so hot. My body was sweating a lot due to the heat and exertion, and my sweat had nowhere to go. It felt like I was being steamed alive in my own suit. I knew we had to get out or we were dead."

Richard got on his radio and called out to his teammates, but he couldn't hear anyone. He describes it as being "eerily quiet". Where was everyone?

"I was beginning to think that everyone else had either gotten out or were dead. Again, I couldn't see anything so I started to feel around me, trying to touch someone else."

Relieved not to have felt the body of a fellow firefighter, Richard again tried to get out.

"I hit my panic button on my breath apparatus to let them know I was in trouble and went for it. Once I made it to the bookcase, I climbed over it and tumbled down the stairs, knocking myself out in the process."

The Watch Manager found Richard and tried to pick him up but couldn't. He says Richard felt like a sack of lead and wasn't

You're inside a building on fire and the temperature has reached 700 deg C. Don't try looking for any paper or wood, they're already distant memories. Any plastics in the room have ignited long ago, and aluminium, lead and tin have already passed their melt temperature. A piece of iron in the building's frame work has become red hot and if you grab it with your insulated gloves for support, it will easily bend in your hands.

This is the intense conditions 26-year-old London firefighter Richard Richards found himself in – an environment so hot it would

make the surface of Venus feel cool by comparison. Even in his protective clothing he knew one thing: if he stayed in the fire a minute longer he'd be dead. He could already feel his body beginning to burn.

Richard, a member of the 'Green Watch' at Wandsworth Fire Station (fire stations have four watches, all colour coded), says the call came in around 10:45pm on 8 January; a three storey terrace house in East Hill was on fire. There was a shop on the ground floor – empty – but there were residents living above. Was everybody out? No one was sure.

sure if he was dead or alive. With two other firefighters assisting, they were able to get Richard out of the burning building.

“When I came to, my mask was off and somebody was speaking to me. I wasn’t sure what they were saying or much else but I knew I was alive.”

In all four firefighters had been injured by the fire but Richard was the worse off. At the hospital they discovered that he had third degree burns, and a combination of third and second degree, covering in total around 18% of his body. The worse affected areas were his arms, back of the neck, shoulder blades and upper thighs.

“The first thing they did was to scrape away all the dead tissue and wrapped me up. My brother took a picture of me that now makes me laugh. The bandages were around three to four inches thick; I looked like a mummy.”

For the first week Richard had to wear uncomfortable plastic splints on his arms to keep them straight, otherwise his hands would have started curling inwards.

“Between the burns and the splints, I was on constant morphine for the first week. This gave me really strange dreams but the nurses said that this was a normal reaction,” he says. “About this time they started then to do the skin grafts, this was more painful than the initial burn,” he says.

“To describe it best, if you can remember falling as a kid and getting a skin graze, well multiply the pain about a billion times, it was that painful. The doctors attached the skin with staples; I had around 300 to give you an idea of the size of my skin grafts.”

Once he got past the dangerous first week, the hospital figured that he would be there for five to seven weeks – at least. However, thanks to his age, fitness level, diet and general health, he was able to leave the hospital after 19 days.

But being back at home with his fiancée and parents didn’t mean he was finished with the hospital. With the bandages requiring specialised care, doing something as simple as bathing was beyond his abilities so he needed to go back around four to five times a week.

“Right now except for my face and a small part of my chest I’m covered with scars, but I’m really lucky. The doctors told me that they had not had a textbook case like me in a long time and I had the fastest recovery they had ever seen – I feel pretty good about that.

“You hear about a lot of people having infections, I didn’t have any. One of the grafts didn’t take as well as it should and it had to be replaced; that was as bad as it got.”

Richard says that his fiancée was mad – the accident happened three days before her birthday – but not at him or the fire brigade. “She - like me - figures something like this goes with the territory of being a firefighter. My family was massively worried, but very supportive. They’re all quite proud I’m a firefighter.”

Richard is telling this story inside the courtyard of the London Fire Brigade’s training centre. As he finishes, a colleague walks by. He asks Richard how much more work they have left on him and Richard holds up his hand. “They got to put another skin graft on here by my thumb,” he says.

“You got anymore skin for them to take?” jokingly asks the other firefighter.

“There’s not much but I’m sure they’ll find a spare patch somewhere,” he jokes back.

After his friend leaves he is silent for bit.

“I don’t know if it’s true but I’ve been told that no firefighter has been burned as bad as I was and lived to tell the tale,” he says, any laughter gone from his voice. “Sometimes it hits me how close I came to dying.”



Firefighter Richard Richards

Richard Richards visits RAFT

Firefighter Richards knows that he is one of the lucky ones; not many people have been as burned as he has and lived. Knowing the role that science plays in coming up with medical solutions to burns and the treatment of scars, he and Commissioner Ron Dobson of the London Fire Brigade recently visited RAFT.

“I knew there was an element of danger when I signed up to become a firefighter, but you still don’t expect something like this will happen to you,” he says. “After the accident, I quickly decided that I wanted to turn what happened into a positive. The work the scientists at RAFT are doing is invaluable.

“If they can cut the time people take to recover from skin grafts, it will make a huge difference to people like me and potentially save lives.

“RAFT is completely funded by donations from the public. If I can help raise awareness for the charity so it can do its vital work, it might mean that in some way my accident has helped other people.”

Injured teacher does three peaks for RAFT



In April 2009, Maria Barefoot was on a skiing holiday in France. The school teacher recalls it was a lovely day; a beautiful day. She was about halfway down a slope, just coming out of turn when a man travelling at speed crashed into her.

She flew about 10 feet and somewhere in between the impact with the other skier and impact with the ground Maria had her last clear thought for the day: "This is going to hurt."

The force of the accident shattered her right leg. Both her fibula and tibia – the strong weight-bearing bones in the lower leg – snapped like twigs, forcing bone through her skin. She had other injuries as well – including a broken hand – but these were almost unnoticeable at the time.

Calls were made for help and French medics scrambled up the mountain to get

to her. It took about two hours before they were able to get her down.

At the hospital, she – and everyone else – thought she was going to lose her leg; it was literally just hanging on with ligaments and torn muscles. An A&E nurse showed Maria an X-ray and told her if they did not operate within 20 minutes, the leg tissue would die and they would have to amputate.

The problem was, the hospital was limited in size and its surgical teams were already busy. Would a surgeon be available? Would a theatre be available? The clock was ticking and time was running out.

However, luck held for Maria and at midnight they were able to operate. Her leg was saved.

"The French surgeon was legendary, without him I doubt if my leg would have been saved. But they said that if my muscles, tendons and ligaments were not as strong as they were, my leg would have come completely off in the collision," says Maria.

She was in the French hospital for five days and then flew home in an air ambulance. Two weeks were spent in bed at her parent's house in Swindon; followed by being in a wheelchair for seven months and then crutches for nine. Two more major operations followed by physiotherapy sessions to learn how to walk without a limp.

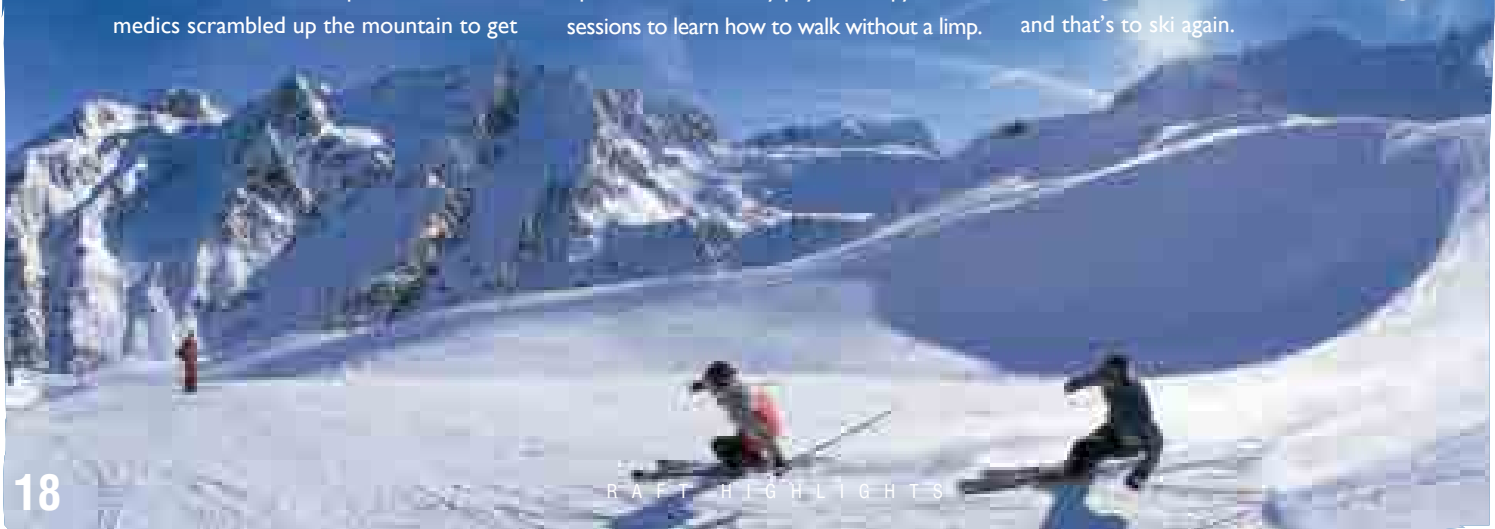
"After the first operation I knew that my leg was most probably saved. But I had a lot of time to think about how my life would have changed if I did lose it. With time on my hands, I started doing web searches on amputations and RAFT came up. I thought what they were doing was amazing and there was no question that I would raise money for them so they can help other people who were not as fortunate as me."

For someone who had doubts about her ability to walk again, she set a high goal for herself in raising money for RAFT: she was going to climb the highest mountains in Scotland, Wales and England in 24 hours – including driving time – The Three Peaks Challenge.

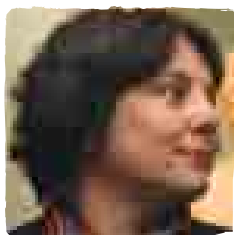
"For me it was a huge personal challenge and one that two years ago I would not have thought possible but strongly motivated by the support and encouragement of friends and family and the thought of the pledges of money I was determined to complete the challenge," she says.

When the times were worked out she was thrilled to have achieved it in a total time of 19 hours and 45 minutes, raising more than £500 for her efforts. "I will definitely do more work for RAFT. I will definitely raise more money," says Maria.

She has given herself one more challenge and that's to ski again.



Pro bono appreciated



"The team is hugely grateful for all the pro bono legal work that has been so generously given to RAFT

during the past year", says Leonor Stjepic. "Much of this work has gone to help move forward the Smart Matrix™ project.

"For example, you will have read about RAFT's exciting - albeit extremely busy - time preparing to take the Smart Matrix™ to clinical trial next year," says Leonor. "As Chief Executive, I am caught in the middle. On one hand, it is essential that I secure the very best legal and other specialist advice possible and, on the other hand, I don't want the Charity to have to bear the cost!

"We are therefore extremely grateful to all those who have donated their time and expertise. We really couldn't have done it without them."

"The team at Covington & Burling is delighted to be assisting RAFT by providing pro bono regulatory advice in relation to Smart Matrix. It's potentially a game-changing technology, and that makes for a fascinating, exciting assignment for us. The dedication, enthusiasm and achievements of the RAFT team are inspirational and it's a pleasure to work with them."

THE TEAM AT
COVINGTON & BURLING LLP

"Dechert has a longstanding tradition of pro bono service and we were excited and honoured to be able to provide assistance to RAFT with respect to this very important project.

We have thoroughly enjoyed working with the dedicated and professional team at RAFT and look forward to building our relationship in the coming years."

THE TEAM AT DECHERT LLP

"Helping a wonderful charity like RAFT with its risk processes allows me to use my day-to-day skills to provide them with the comfort they need on risk management, while getting on with their own particular skills to help other people.

"I think everyone with a talent should be encouraged to help the third sector - the benefits are two-way. I've never had experience in medical or charitable risk management before, so it has also added to my skill set: a win-win for everyone!"

ELAINE HEYWORTH

Volunteer here!

RAFT is looking for a few good people who can help out in a variety of tasks. These jobs range from investigating the practicality of a main street charity shop to helping with an eBay account.

"We have jobs waiting at our Mt Vernon Hospital office that we could put a person in today," says volunteer coordinator Christine Miles. "That said, we're not going to tell you what you can't do; we're here to listen to what you can."

Existing volunteer jobs include:

- Sorting, photographing and posting eBay items
- Manning the RAFT stand at charity events
- Help with data research
- Arrange and assist with fundraising events
- Research the practicality of a charity shop

You might have other talents, however, which you can bring to RAFT. All ideas will be considered and appreciated.

"We're looking at all ages, people who are working or between jobs, and students," says Christine. "The time frame we're looking at is anywhere from two hours a week to 14 hours a day. If you're enthused and have fresh ideas, we'd love to hear from you."

Contact Christine Miles on 01923 844371 or miles@raft.ac.uk

Manager sets own standards high



All outgoing wastes which have the potential to be biohazard are treated first by Khwaja, just one of his many jobs.

You turn on your tap and water comes out. You never think about it; where it comes from; where it's treated because 99.99% of the time, you turn the tap and out it flows.

RAFT Lab Manager Dr Khwaja Islam's job is similar to that tap. If you're working in a lab and reach for a new pair of gloves, you don't think how they ended up next to you. The fact that RAFT's labs are safe, clean and well lit – again – who wonders about that? Staff get trained, fire alarms are tested, new lab equipment appears, even a broken toilet seat seems to mysteriously get repaired – no one thinks about it.

Ah, but in the one month that Khwaja left RAFT, everyone started realising just how much he did.

Accountant, Mary Pearmain, has numerous positive adjectives to describe Khwaja but 'efficient' is the one you hear most.

"I don't think people realise how much he does here, Khwaja is too efficient at his job," says Mary. "He's so dependable, he's a rock. I don't know what we'd do without him."

She thinks for a moment. "Let me put it this way, if he's in when I come in, I know that all is right with the world."

To an outsider, the job of lab manager seems to be one you could take somebody off the street, give them a week of training and set them loose. At first – and even second – glance it is hard to believe that you need somebody with a doctorate to oversee a laboratory.

"Khwaja took a position at a lab at Oxford so we had to find a replacement. I thought that 'premise manager' described his job, I was wrong," says Mary. "To run a lab, you need a science manger first, somebody who has worked in a lab. I was so glad when Khwaja came back."

When you ask Khwaja what he does he laughs and looks up at the ceiling as if the answer can be found there. "Every day is different at RAFT, you wouldn't think so but it is."

Management of the laboratories and overseeing all the equipment inside each one, Khwaja's your man. Health and safety concerns, turn to Khwaja. Training new staff, interns and students how to work in a lab (there were 20 this year), look to Khwaja. Lab consumables, waste products, computer problems, maintenance contracts, new equipment, all fall under Khwaja's umbrella.

When earlier this year Khwaja decided to take a new position at Oxford he was asked to write up his job description to aid in finding a replacement. The end result was three full pages of line items – all in a small point size – with no gaps between lines.

"I thought that after four years at RAFT, it was time to do something different. A voice in my head kept telling me that I had to move up and on, so when a position opened up at Oxford, I decided to try for it."

Khwaja was awarded his doctorate at Oxford in diabetes research and had worked there before. Despite this, however, he says that he didn't feel at home there with his new job and returned to RAFT – to everyone's relief.

"I learned that job satisfaction and happiness is more important in life," says Khwaja.

"Once I left RAFT I realised how happy I had been there, it's like a family. The job I was going to was more prestigious, but in the end I decided that that really didn't matter. I like it here."



Left to right: Amanda Bailey, Laura Ripley and Christine Miles.

When you watch RAFT's fund raising team in action - Amanda Bailey, Christine Miles and Laura Ripley - it's hard not to see them as highly dedicated members of a sporting team. Each knows their role and how best to serve RAFT. We catch up with all three for an interview

What's your average day like?

LAURA – There's no such thing as an average day at RAFT, that's why I love coming into work! As a Community Fundraiser I am responsible for helping anyone who wishes to raise funds for our important research. This makes my job so varied and interesting, with different supporters doing such a broad range of activities in order to help us. Today, I'm off to present RAFT's work to a Community Group and give them ideas how they could help us, when only last week I was busy inviting people to one of our own events. I love my job!

How dependent is RAFT on your efforts?

AMANDA – RAFT needs to raise a minimum of £1.1 million during the year ahead to cover the costs of its current research. In the same way that experiments need to be planned in advance, so does the income. Our annual target is broken down into monthly segments as the Charity is dependent on a steady income and we produce a Fundraising Business Plan to accomplish this. We review our plan on a monthly basis and make the

necessary changes so that we can be as accurate as possible in our forecasting...which makes for a happy Accountant.

How can I be sure that my money is making a difference and that it is not being wasted?

CHRISTINE - Every pound donated is important to us. Even though some of our events raise thousands of pounds, their success is achieved by supporters buying raffle tickets or individuals and small companies donating gifts for us to auction. Yes, we are lucky to have large companies sponsor some of the event expenditure, but we rely on the generosity of individuals too. We can assure you that your donation will always make a difference – come and see what we do, we can show you around the laboratories and you'll be able to meet the researchers and see how the funds are being spent. Research is expensive but every donation counts.

What is the hardest part of your job?

AMANDA - Translation! A major part of my role is to secure funding for projects. I also give updates to our supporters on the progress of the research. This might sound easy, however, I am not a scientist and neither are the majority of our supporters. I need then to spend time with the scientists to get a true grasp of the progress/breakthroughs and the impact that this will have on improving the treatments

for patients. Scientists must have a lot of patience in order to carry out their detailed experiments and I am grateful that they extend their patience to me too!

How can I help RAFT?

CHRISTINE - If you work, you can recommend RAFT as your company's chosen charity. This usually means that any fundraising done by your colleagues is donated to the chosen charity. Many companies 'match fund' which means that if you choose to raise funds for us, then your company will match what you donate, doubling your fundraising effort!

I'd like to do a challenge event to raise money for RAFT. How do I go about this?

LAURA - Perhaps you want to increase your fitness levels? A sponsored bike ride or run could be just the thing. Are you and your team good sales people? If so, maybe a cake or jumble sale is the way to go. So donors know exactly where their money is going, the cost of the event will need to be paid for by you and not through money collected for RAFT.

Whatever you do, we are here to help you achieve your goals. All you need to do is give me a call on 01923 844017 or via email ripley@raft.ac.uk and we can either talk through your ideas or provide you with some of ours. At RAFT we are dedicated to helping anyone who wants to help RAFT raise funds and/or awareness and will stay in regular contact before, during and after your event.

Thank you, from the team

“

Without your generous support, RAFT would not be here. As Chief Executive, I can honestly say that each and every member of our staff does all that they can to make sure your pounds are wisely spent. From the scientists to the medics to the fundraising staff – each one of them is totally dedicated to their work and is always prepared to go the extra mile. I am proud of them and thankful to you for helping us make lives better.

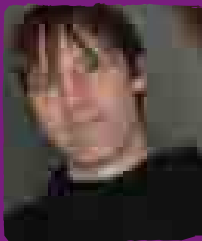
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Leonor
Stjepic



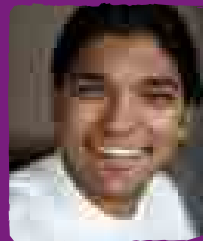
Nivedita
Ravindran



Mike
Wood



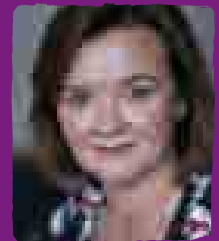
Christine
Miles



Vaibhav
Sharma



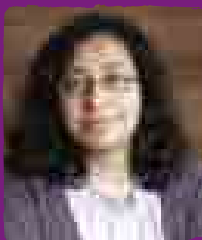
Mary
Pearmain



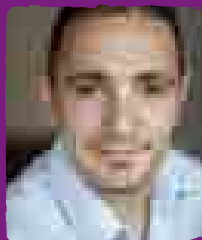
Amanda
Bailey



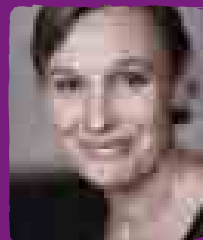
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Mitrovich



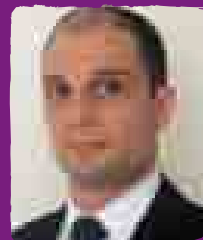
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Patel



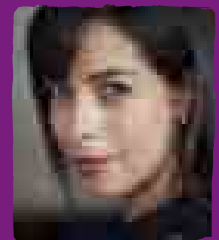
Dr Nick
Kassouf



Dr Rachel
Haywood



Yazan
Al Ajam



Dr Raina
Zarb-Adami



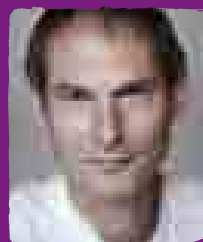
Laura
Ripley



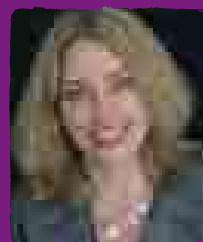
Dr Khwaja
Islam



Niroshahaa
Rangunathan



Dr Julian
Dye



Susan
Moore



Gwen
Coles

Finance

Income Summary

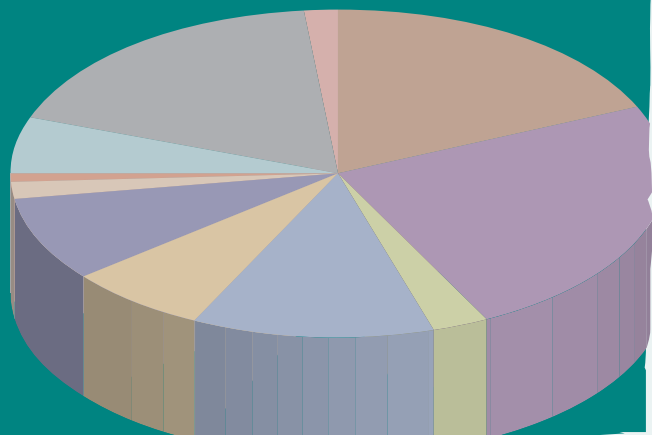
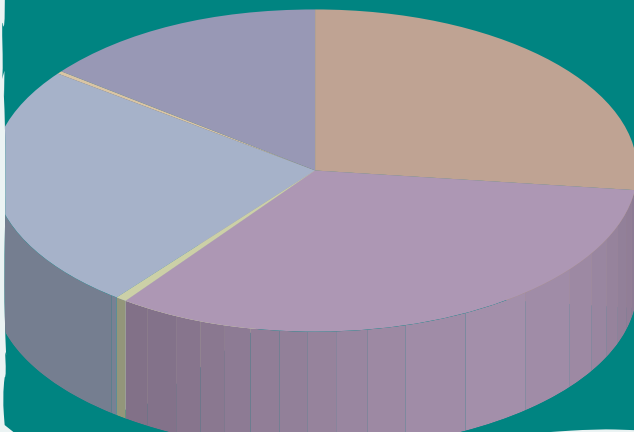
Grants	232,559
Trusts & Major Donors	285,600
Industry	4,500
Events	213,996
Investment Income	257
Other Donors	131,383
Total Income	868,295

No director of the Trustee company, or person related or connected by business to them, has received any remuneration from the Trust during the year. In addition, there were no expenses reimbursed to trustees during the year. No employee was paid above £60,000 during the year nor were any severance payments made.

Information taken from Draft Accounts.

Expenditure Summary

Smart Matrix™ Core Project	176,526
Smart Matrix™ Acute & Military	233,240
Smart Matrix™ Chronic Wounds	24,901
Smart Matrix™ Clinical Translation I	113,623
Skin Cancer Prevention	64,706
Sun Damage	78,627
Bionic Limb	13,462
Education	6,307
Event Expenses	52,804
Fundraising	170,485
Governance	14,597
Total Expenditure	976,278



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