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## Editorial

Gino Gerosa

Welcome to the winter 2015/2016 edition of TECAS-ITN newsletter. In this edition, we present a summary of the latest events among the TECAS Network. The 2<sup>nd</sup> Annual Work-in-Progress meeting of the TECAS-ITN took place at the Helmholtz Institute of the RWTH Aachen University in Aachen, Germany, from the 1<sup>st</sup> to the 4<sup>th</sup> of December 2015. The Network got together in this historic town, where the Fellows had the opportunity to present their progress through oral presentations and to get their results discussed in the supervisory committees and reviewed by all the TECAS Investigators. The meeting also served as the venue for the final cohort of the intermediate examination of the TECAS-ITN Fellows.

The agenda of the meeting was filled with several important activities for the Fellows and for the entire Network, including a keynote lecture on Decellularised extracellular matrices delivered by Dr Payam Akhyari from the University of Düsseldorf and the Women in Science & Engineering - WISE lecture by Professor Stefanie Reese, from the RWTH Aachen University. During the meeting, two workshops on Translation, Exploitation & Standardisation and on Complementary & Transferable Skills, as well as a patient focus seminar were organized collaboratively by the

RWTH Aachen University and the Hannover Medical School.

In this trimester, the TECAS-ITN activities have reached the public through the release of the first TECAS-ITN Wikipedia article and an open-interview by the visitors of the Spanish website Menéame, both regarding TECAS-related projects.

In the next months, the Network will participate to notable European technological/biomedical events as the Patras IQ Technology Transfer Fair in Patras, Greece, the Hannover Heart & Lung Fair in Hannover, Germany and the Biomedica in Aachen, Germany. Moreover, additional public engagement and training activities such as Summer schools and courses will be organized in Germany, Italy and Greece.

## Annual Work-in-Progress meeting

*Eirini Chatzigeorgiou*

The 2<sup>nd</sup> Annual Work-in-Progress (WiP) meeting of the TECAS-ITN took place between the 1<sup>st</sup> and the 4<sup>th</sup> of December 2015, in Aachen, Germany. The meeting was held at the Helmholtz Institute of the RWTH Aachen University and was chaired by Professor Stefan Jocken-



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### COST: training opportunities on European Commission Portal

Catia Fidalgo - Marie Curie Fellow

Among several opportunities given by European Commission for training of young students and researchers, the COST (European Cooperation in Science and Technology) program is the longest-running European framework supporting transnational cooperation among researchers, engineers and scholars across Europe. COST actions are bottom-up science and technology networks, open to researchers and stakeholders with a duration of four years. Who can apply? Researchers from: universities, research centres, large and small, public and private organisations, from all 36 COST Member Countries and its Cooperating States; from any science and technology field and at any career stage and, researchers who have any original, innovative idea. This program is focused on building capacity by connecting high-quality scientific communities in Europe and worldwide; providing networking opportunities for Early Stage Researchers and increasing research impact on policy makers, regulatory bodies and national decision makers as well as on the private sector. COST actions are:

- Pan-European - Spanning 36 member countries;
- Researcher-driven - in terms of proposed topics, objectives and work organisation, researchers choose their own topics, the final decision being taken by Action's Management Committees;
- Open and Inclusive - it is open to all researchers, engineers and scholars, independently of the gender, field or career stage;
- Multi- and interdisciplinary - building, bridging and expanding multi- and interdisciplinary science and technology research communities;
- Future-oriented - engaging the next generation of young researchers;
- Lightweight - they are a light platform to coordinate national research funding through easy networking tools and simple rules.

COST is active through a range of networking tools, such as workshops, conferences, training schools, short-scientific missions, dissemination activities and publications. Regarding STSMs, they are intended especially for young researchers and includes exchange visits between researchers involved in COST Actions. They are aimed at fostering collaboration, sharing new techniques and infrastructure that may not be available in other participants' institutions or laboratories. For more information, visit <http://www.cost.eu/>.

hoevel and Dr Petra Mela. The 4-day meeting included oral presentations delivered by the TECAS-ITN Fellows, summarizing their research and training progress so far, management and training activities attended by the TECAS-ITN Fellows and Investigators as well as by other researchers of the RWTH Aachen University.

In addition, two members of the TECAS-ITN External Advisory Board, Professor Artur Lichtenberg (University of Düsseldorf) and Dr Christof Hurschler (Anna Stift Clinic for Orthopaedic Surgery) attended the meeting and provided their feedback on the results achieved within the first 3 years of the Network, as well as on the future plans for the translation of the research results and the improvement of the employability of the Fellows.

Among the highlights of the WiP meeting was a keynote lecture on Decellularised extracellular matrices delivered by Dr Payam Akhyari (University of Düsseldorf), a patient focus seminar delivered by Professor Jan Spillner (RWTH University Hospital) and a WISE seminar by Professor Stefanie Reese. (RWTH Aachen University). Additional highlights included a tour of the laboratories of the Helmholtz Institute, the 1<sup>st</sup> Translation, Exploitation & Standardisation Workshop, as well as the 2<sup>nd</sup> Complementary & Transferable Skills Workshop of the Network, organized in the last 2 days of the WiP meeting.

During the 4-day event, the TECAS-ITN Fellows had the opportunity to meet with their supervisory teams and discuss in depth the progress of their work, while the intermediate assessment of 2 of the TECAS-ITN Fellows also took place.

On a different level, the participants in the meeting seized the opportunity to explore the historical city of Aachen, residence of Charlemagne and coronation place for the German kings. The social programme of the meeting included a private tour of the Aachen Cathedral and its Treasury, a visit to the Christmas market of the city, as well as a dinner featuring local specialties.

Just a few days before the beginning of the



final year of the TECAS-ITN, the 2<sup>nd</sup> WiP meeting was a great opportunity for all participants to meet and discuss, as well as to review and update current and future plans and actions.

### TECAS-ITN Complementary & Transferable Skills Workshop

The 2<sup>nd</sup> Complementary & Transferable Skills Workshop was organized on the 4<sup>th</sup> of December, in Aachen, on the occasion of the Annual Work in Progress meeting of the TECAS Network. The workshop was delivered by Next



Level Consulting GmbH and was focused on Creativity and Improvisation in research projects. During the 1-day workshop, coached by actress Valerie Habicht-Geels, the TECAS-ITN Fellows explored their creativity, picked up anti-blocking-mind techniques and learned how to work together in an efficient, productive and funny way.

### TECAS-ITN Intermediate Assessment

The third cohort of the intermediate assessment was concluded in December 2015, in Aachen, Germany. During the WiP meeting, Fellows Cristian D'Alessandro and Adel

Badria (University of Patras) completed their oral assessments and received valuable feedback on their work so far, as well as recommendation for their next steps.

### Investigation of the growth and calcification potential of fibrin gel-based TE valves *in vivo*

Shane Mulderrig – Marie Curie Fellow



There are major drawbacks associated with current commercially available heart valve prostheses, the most significant of which is their lack of remodelling and growth potential. Tissue-engineered heart valves, (TEHVs), constructed

from autologous tissue, have the potential to overcome this problem. In addition to this, the possibility of having an endothelialized surface, life-long durability, and no foreign body responses, strongly presents TEHV's as the future of heart valve replacement procedures. Before clinical use of TEHV's can become widespread, they must first be tested in large animal models to analyse their success *in vivo*. The ovine model is well established and

The focus of the ESR8 fellowship is to develop an autologous TEHV capable of withstanding physiological pressures and flows. Concurrently, a flow-loop bioreactor system will be developed, capable of testing valves to these prescribed conditions whilst allowing for a variety of monitoring techniques for thorough evaluation. The TEHV and the flow-loop system can then both be used in the generation of valves for an *in vivo* study.

The subsequent *in vivo* study aims to create 12 autologous TEHV's, condition them dynamically, and implant them in 6 sheep keeping the remaining 6 valves as *in vitro* controls. The schematic below highlights the general concept of the procedure including the preparation of the fibrin gel, the creation of the customized mold and the cell cultivation before molding, dynamically conditioning and finally implanting the valve.

The performance of the valves and the general health condition of the sheep will be regularly evaluated throughout the implantation. 3 of the implanted valves will be explanted after 3 months and the remaining 3 after 6 months. Evaluation of the explanted valves will include tissue analysis, screening for calcification and evaluation of geometry with respect to native valves and valves at implantation.

This fellowship will essentially attempt to aid

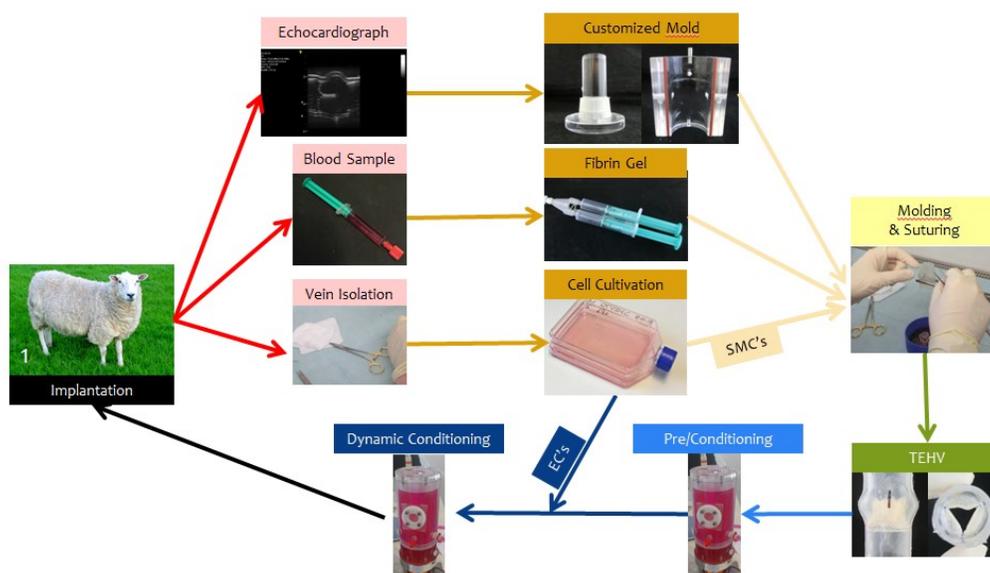
### A Selfie

Born and raised on the rural west coast of Ireland, I long held aspirations of experiencing as many different cultures as possible and making a real tangible difference in the world. My uncertainty in how I would achieve these goals encouraged me to try as many different things as possible and invoked in me a real zest for life.

I was always crazy about sports and at 11, I was part of a relay team which won a national gold medal. This was obviously a long time ago now, but I am at least always in a position to say that I was a national running champion!! Despite this early success, sporting stardom remained elusive and my career growth always veered in a more academic direction. I found math and the sciences to be the most mentally stimulating subjects at St. Louis secondary school and from this I opted to apply for General Engineering courses at Irish universities. For my academic performance at St. Louis, I was offered a scholarship by the National University of Ireland Galway (NUIG) which I was delighted to accept.

I would later specialize in Biomedical Engineering primarily because the addition of a biological aspect seemed like an interesting dynamic to layer over the conventional engineering denominations. The proximity of NUIG to my original home-place was a further benefit as it allowed me to retain a part-time job and ease the financial burden on my parents who had three other children to educate! Despite the significant personal and professional growth I made during my time at university I felt I still lacked a defined career path and world experience. I applied for a US visa and spent 5 months travelling and working in bars and restaurants. This more relaxing time in my life gave me time to think and decide what my next career step would be. I began seriously considering a PhD and this is where the Marie-Curie network stepped in! I became aware of the ESR position at RWTH Aachen aiming to conduct an *in vivo* study of TE heart valves and found it to be exactly the type of position I was looking for.

My position in the Marie Curie TECAS program has offered me the opportunity to work towards the aspirations I referred to at the very beginning of this article. Working in an international organization with such creative and interesting peers is a genuine thrill, and conducting research aimed at improving the quality of life for people around the world is certainly making a difference.



commonly used for such evaluations because of the comparable cardiovascular anatomy and tolerance to invasive cardiothoracic surgery.

the progress of TEHV's in their development towards a more complete clinical solution for both congenital valvular defects and acquired valvular diseases.

## TECAS-ITN Calendar

TECAS-ITN Summer School "From High-school to University and Beyond"  
April 2016, Patras, Greece

TECAS-ITN @ Technology Transfer Fair  
Patras IQ 2016  
April 2016, Patras, Greece

TECAS-ITN @ Biomedica – The European Life Sciences Summit  
May 2016, Aachen, Germany

TECAS-ITN courses:  
May 2016, Hannover, Germany

TECAS-ITN @ Hannover Heart & Lung Fair 2016  
June 2016, Hannover, Germany

TECAS-ITN School on Cardiovascular Regeneration  
June 2016, Hannover, Germany

## TECAS News

For more information about the TECAS-ITN events and activities please contact us at:

[doctoral.academy@mh-hannover.de](mailto:doctoral.academy@mh-hannover.de)

We are looking for articles of interest to the TECAS-ITN community, which may include conference reviews, research, or any other hot topics. We look forward to hearing from you.

If you wish to contribute to the TECAS-ITN newsletter (next edition Spring 2016) then please email us at:

[doctoral.academy@mh-hannover.de](mailto:doctoral.academy@mh-hannover.de)

Keep up to date with the latest TECAS-ITN news and events by checking out our website:

[doctoralacademy.mh-hannover.de](http://doctoralacademy.mh-hannover.de)



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## Events

### TECAS-ITN Patient Focus Seminars

During the last months, TECAS-ITN organized and participated in patient focus seminars on two different occasions. On the 3<sup>rd</sup> of December 2015, UKAachen organized a patient focused seminar which was delivered by Professor Jan Spillner, at the Helmholtz Institute, in Aachen, Germany.

On the 18<sup>th</sup> of February 2016, the TECAS-ITN group of TU/e took part in the PULS 2016, the largest national meeting for and between patients, researchers and companies, participating in several patient focus seminars.

### TECAS-ITN Translation, Exploitation & Standardisation Workshop

The 1<sup>st</sup> Translation, Exploitation & Standardisation Workshop of the TECAS-ITN took place on December 3, at the Helmholtz Institute of the RWTH Aachen University in Aachen. The workshop was co-organized by UKAachen, Corlife and MHH and included a seminar on scientific writing delivered by Dr Sotiris Korossis (MHH), a lecture on translational strategies of TE implants by Mrs Julia Frese (UKAachen), a practical with guidelines for drafting a business plan out of a research project delivered by Dr Michael Harder (Corlife), as well as a workshop on IP rights presented by Mr Yuriy Shkonda (Innovation Scout; UKAachen). The workshop was attended by the TECAS-ITN Fellows and Investigators, as well as by other researchers outside the TECAS Network.

### High-5

High-5 is an initiative of the TU/e Innovation Lab and includes a series of lectures aiming to create an environment that will facilitate the interaction and interrelation between the private sector and the academia. TECAS-ITN was represented by the TU/e group on the second event of the series on the 15<sup>th</sup> of February 2016.

### TECAS-ITN WISE seminar

Last December, the University Hospital Aachen (UKAachen) organized a Women in Science & Engineering seminar on the occasion of the TECAS-ITN Annual Work-in-Progress meeting. Invited keynote speaker was Professor Stefanie Reese (RWTH Aachen University). The event was attended by the TECAS-ITN Fellows and Investigators, as well as by

other researchers from the RWTH Aachen University. In the first part of her speech, Professor Reese engaged the audience in a discussion about career options available for female scientists, deriving from her personal experiences on the matter. In the second part, she presented recent developments in her research work on Mechanical modelling, focusing on stents and heart valves.

### TECAS-ITN in the News



The 1<sup>st</sup> TECAS-ITN Wikipedia article was published by Fellow Artemis Kouvaka (MHH) in January 2016.

The article, published in the English version of the website, gives information about the quality control in tissue engineering. This is the first of a series of articles, prepared by the TECAS-ITN Fellows for the site of Wikipedia, as part of the TECAS-ITN public outreach activities. The full article can be found at:

[https://en.wikipedia.org/wiki/Quality\\_control\\_in\\_tissue\\_engineering](https://en.wikipedia.org/wiki/Quality_control_in_tissue_engineering)

In February 2016, TECAS-ITN Fellow Esther Samper (MHH) was featured in the popular Spanish website *Menéame*, in an open interview with the visitors of the website. During this interview, the visitors of the website had the opportunity to ask questions regarding science in general, and cardiovascular TE in particular. The post was very popular, receiving over 5000 views. The full interview is available in Spanish at: <https://www.meneame.net/TeRespondo/hola-soy-esther-samper-investigadora-medicina-regenerativa>.

