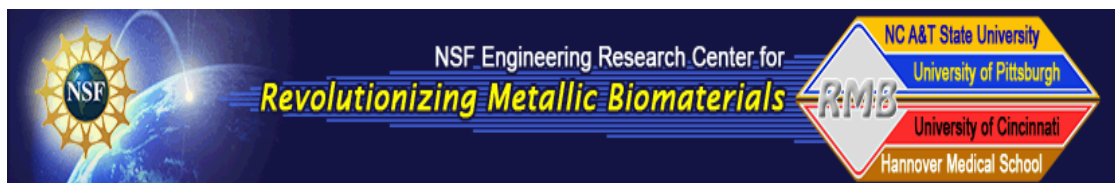
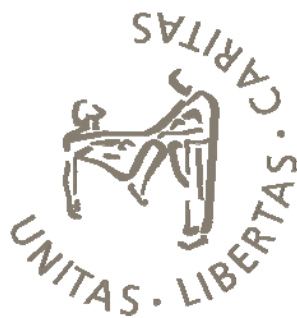




Hannover Medical School

US-German Research Collaboration & Global Student Exchange



designed by Dorothee-Catherine Wengelnik, ERC-RMB Satellite Manager, Hannover Medical School, Germany



Table of Content

Initiation of the Exchange Program 3
Support and Preliminary Phase 3
Establishment of the ERC-RMB Satellite..... 3
Support for the Program..... 4
Exchange Program 2010/2011 Academic Year 5
 Interview with Daniel Maskarinec 6
 Interview with Sanjeev Khanna 6
 Interview with Richard Jeffries..... 7
 Interview with Dandan Hong 8
 Interview with Julia Kuhlmann..... 9
Exchange Program 2009/2010 Academic Year 10
 Interview with Frank Petraglia..... 11
The Future of the Program..... 12



Initiation of the Exchange Program

Professor Frank Witte¹ has initiated and created a unique alliance together with the University of Pittsburgh, the University of Cincinnati and the North Carolina A&T State University². Professor Witte researches processes that enhance the fundamental knowledge and technology in the field of revolutionizing metallic biomaterials in order to improve biodegradable magnesium based metal implants. As the Engineering Research Center-Revolutionizing Metallic Biomaterials (ERC-RMB) Global Site Coordinator, Professor Witte aims to create a global research environment in order to equip his students with the necessary global world vision, the latest technology know-how in the field and required leadership skills that will be needed when entering the work force.

Support and Preliminary Phase

Professor Witte works very closely with the National Science Foundation (NSF)³ and the German Research Foundation (DFG)⁴. During the preliminary stages, the partnering universities and the NSF came together and discussed how to initiate an exchange program with this format.

In order to better facilitate a quick start into the exchange program, Professor Witte conducted several interviews with representatives at the NSF in Washington, DC. In addition, he also was the co-moderator of the break-out session of the ERC annual meeting in 2009, where global connectivity of 3-Gen-ERC's has been discussed. In year 2010, Professor Witte traveled to Washington DC again to talk about this topic in greater detail.

Establishment of the ERC-RMB Satellite

The 3-Gen-Engineering Research Council (3-Gen-ERC) decided that an ERC Satellite should be established at the Hannover Medical School, Germany. The collaboration unanimously decided to create the new position of the ERC-RMB Satellite Manager, who is fully funded by Professor Witte. The position has been assigned to a well-qualified MBA trained in the United States who has taken on the leadership role for all exchange issues, the organization and facilitation of the exchange program, founding, development of the program, as well as for PR and promotions for the program.

In order to facilitate better the needs of all parties, the ERC-RMB Satellite Manager has created a comprehensive database of scholarships and funding availabilities. The ERC-RMB Satellite Manager has designed this process in order to guarantee that the application process and the required application materials for the specific programs are more accessible and transparent to students. German students interested in participating in the exchange and foreign students who need help with all questions related to their

¹ Professor Frank Witte, MD. <http://erc.ncat.edu/people/?facultyID=21>

² NSF-RMB. <http://erc.ncat.edu/>

³ National Science Foundation. <http://www.nsf.gov/>

⁴ Deutsche Forschungsgemeinschaft. <http://www.dfg.de>



Professor Frank Witte, MD
Hannover Medical School

study abroad program are welcome to visit the Satellite Office at M07-04-4060⁵ at the Hannover Medical School campus during walk-in hours.

Support for the Program

A lot has happened during the preliminary phase on the German side, which created great enthusiasm and respect on the American side. Especially Professor Sankar⁶ and Professor Borovetz⁷, who are part of the leadership team of the ERC-RMB, have expressed their full academic support for the program.

Through the support of the United States universities and the ERC-RMB Satellite Manager, two years of graduates have participated in the German-US exchange program. The University of Pittsburgh has been very active in the exchange and has sent seven students through the program in 2009 and 2010. Two students and one supervisor from the North Carolina A&T State University and One Ph.D. Student from the University of Cincinnati has been visiting Hannover Medical School so far. The American students were supported entirely through the ERC and the student's universities.

⁵ Location of the Satellite Office. <http://www.crossbit.eu/index.php?id=385>

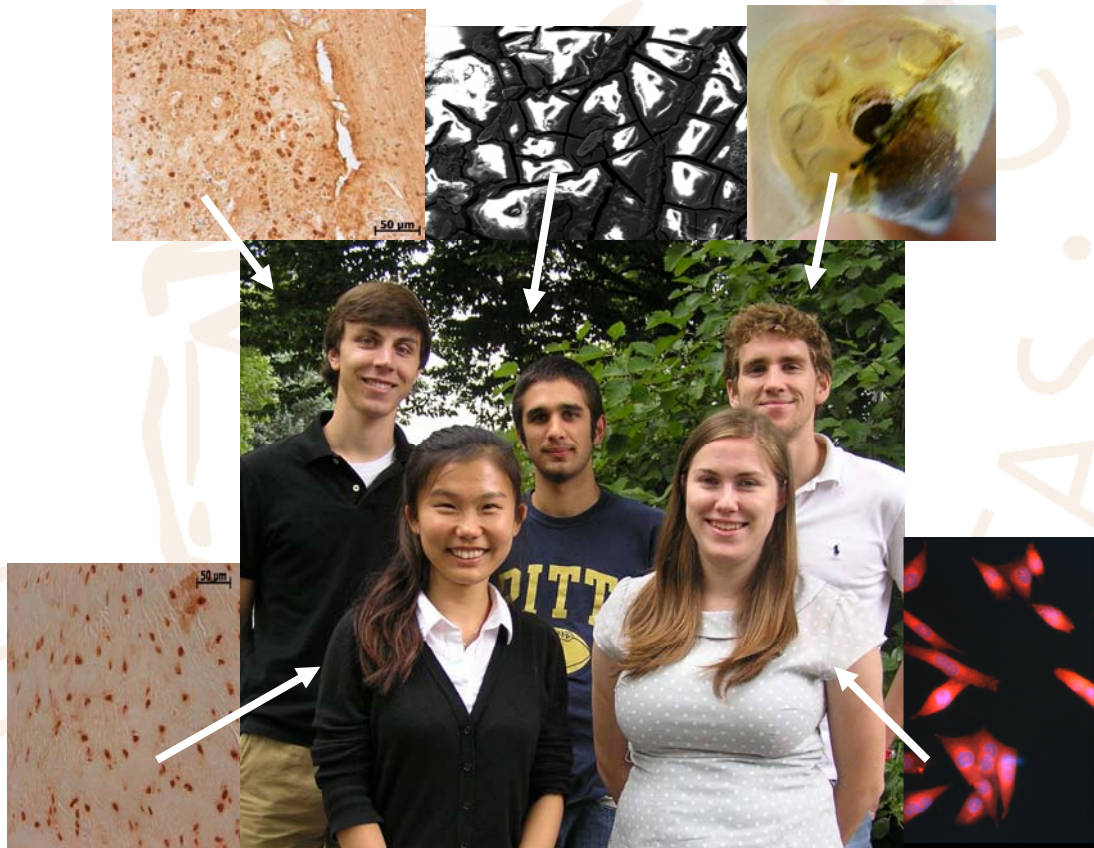
⁶ Professor Sankar. <http://erc.ncat.edu/people/?facultyID=10>

⁷ Professor Borovetz. <http://erc.ncat.edu/people/?facultyID=14>

Exchange Program 2010/2011 Academic Year

This summer, five students from the University of Pittsburgh were in Hannover, Germany and performed their research at the laboratories of Hannover Medical School. Professor Witte’s program requires each student to develop research strategy and follow through with a research project that they present before exiting the program. A committee will then give constructive feedback and evaluate the students on their work and commitment to the program.

Here are some of the US students and a photo of their research projects.



Dan Maskarinec, Sanjeev Khanna, Richard Jeffries, Dandan Hong, Jennifer Huling

In order to support all United States students and their specific needs as Bachelor, Master or Ph.D. students, the ERC-RMB Satellite Manager has designed and developed an evaluation form. This evaluation has made it possible to adapt and strengthen the program and its unique benefits to the students further. Strengths and weaknesses could be analyzed based on managerial models, such as the Porter’s Five Forces Model⁸ and the SWOT Analysis⁹. In addition, voluntary interviews were conducted that are presented below.

⁸ Porter’s Five Forces Model. <http://www.quickmba.com/strategy/porter.shtml>

⁹ SWOT Analysis. http://en.wikipedia.org/wiki/Porter_5_forces_analysis



Interview with Daniel Maskarinec

Research completed while in Hannover:	BrdU was used to determine which cells around magnesium implants were reproducing, and furthermore likely to be responsible for observed new bone generation.
Short summary of your stay	Stayed in provided student housing for 2 months while completing research projects in LBB.
Which projects did you complete?	Established protocols for anti-BrdU staining of Paraffin embedded sections using streptavidin-HRP, DAB and DAPI; anti-BrdU staining of Technovit embedded sections using streptavidin-HRP, DAB and DAPI; anti-BrdU staining of Technovit embedded sections using streptavidin-Cy3 and DAPI.
How did the work you completed in Hannover help you with your studies?	First exposure to research. Gained understanding and experience of histological techniques and theory.
Would you participate in the exchange again? If yes, why? If no, why not?	Yes. Great opportunity to go abroad which is tough with rigorous BioE curriculum. Great experience to add to resume. Opportunity to be immersed in another culture.
What did you like the best during your stay in Hannover?	Exploring Germany and Europe. I liked having a bike to explore. I loved experiencing the hype of Europe during the World Cup.

Interview with Sanjeev Khanna

Short summary of your stay	Creating an in vitro system to model the corrosion of magnesium samples.
How did the work you completed in Hannover help you with your studies?	The Hannover research helped me to gain valuable experiences in a research laboratory.
Would you participate in the exchange again? If yes, why? If no, why not?	Yes I would participate again. The experience of living in another country, as well as working in a professional research setting is an ideal summer program.
What did you like the best during your stay in Hannover?	Being exposed to a country and culture I was not accustomed to and forming friendships with kids from all over the world in the dormitories.



Interview with Richard Jeffries

Research completed while in Hannover:	Optimization of a system that could dissolve titanium embedded in a plastic by electrochemical means for histological evaluation.
Short summary of your stay	Had the opportunity to expand my breadth of knowledge by getting exposure to immunohistological staining, as well as biomaterial studies.
Which projects did you complete?	Electrolytic dissolution of Technovit 9100 New embedded percutaneous titanium implants.
How did the work you completed in Hannover help you with your studies?	Made me more well rounded in terms of lab experience and forced me to think outside the box by working on something I had no prior experience with.
Would you participate in the exchange again? If yes, why? If no, why not?	Definitely yes. I really enjoyed the people and culture in Germany and Hannover specifically. I feel as though there are similar opportunities in the United States I could have pursued. However nothing could provide me with an experience nearly as rewarding.
What did you like the best during your stay in Hannover?	I think my favorite part of my Hannover experience was getting to live day to day like a German (or as close as I could guess it to be). The one thing you can never actually get a feel for when traveling is how natives spend their days. Unless you're living in the same place for long enough to settle in. All you'll ever have the opportunity to see is other tourists and the famous buildings that shape the culture. Especially with a smaller big city like Hannover, which would fall somewhere between each of the population extremes, I felt like I really got to experience modern day Germany.



Interview with Dandan Hong

Which projects did you complete?	Project entitled “Temporal Changes of Vessel in Magnesium Implanted Bone Regeneration”
How did the work you completed in Hannover help you with your studies?	Now, when I’m looking for a job, I can say that I have experience with histological studies, which will broaden the range for job opportunities.
Would you participate in the exchange again? If yes, why? If no, why not?	Yes! Not only did I learn histological techniques, at the same time, I also had a lot of fun making new friends and travelling with friends. Everyone around was like a family. This exchange program was educational and fun at the same time. I feel extremely lucky to have participated in this program! It was a lifetime experience.
What did you like the best during your stay in Hannover?	Everyone was friendly, helpful, and funny. The city was very green and clean. I was able to ride my bicycle everywhere in the city. Maschsee Lake Festival was a lot of fun.

The students are mainly researching in the following areas: (I.) musco-skeletal applications and (II.) responsive biosensors for implants. The program allows the students to build a well-functioning international relationship with researchers around the world. In addition, students are expected to research on how to improve patient care and develop their own project concepts.

The Ph.D. student Julia Kuhlmann from the University of Cincinnati has spent a lot of time in the laboratories of Professor Witte and his team. Through her research experience, she was able to gain a lot of experiences for her doctoral thesis.

Ms. Kuhlmann especially liked the great working conditions and state of the art equipment that is used in the laboratories of Professor Witte. In particular, she also liked the help and support she received from Professor Witte’s team. Because of her great experience, Ms. Kuhlmann has decided to gain further research experiences and to build upon her capabilities as a researcher during a second visit to the Hannover Medical School during the fall 2010 semester.



Ph.D. student Julia Kuhlmann during establishment of H₂-sensors

Interview with Julia Kuhlmann

<p>Short summary of your stay</p>	<p>I visited Dr. Witte's lab for only one week to initiate collaboration on in vivo corrosion measurements. Initial measurements were carried out and displayed general challenges associated with in vivo measurements.</p>
<p>How did the work you completed in Hannover help you with your studies?</p>	<p>Gave insights to challenges of in vivo measurements</p>
<p>Would you participate in the exchange again? If yes, why? If no, why not?</p>	<p>Yes, to complete in vivo measurements of hydrogen gas</p>



Professor Frank Witte, MD
Hannover Medical School

During the Fall 2010 semester, two PhD students and one Professor from North Carolina A&T State University also visited the Hannover Medical School. During their stay, the students completed extensive courses on animal models and in-vivo imaging. They gained intensive knowledge and hands-on training in magnesium corrosion studies for their own research advancement within the ERC research. Especially the training on microtomography has been very valuable for the new Nanotome CT-device at NCAT.



Professor Yun, Leon White and Giri Venkataraman in Dortmund, Germany.

Exchange Program 2009/2010 Academic Year

Paul Shin and Frank Petraglia were two of the first students of the program who have written research papers during their stay in Hannover about the following topics:

„Dynamic Live-Imaging of Cell Function and Morphology on Opaque Biodegradable Biomaterials,“ and „In Vivo Imaging of the Skin-Implant Interface in Percutaneous Implants by Optical Coherence Tomography.”



Frank Petraglia and Paul Shin present some of their research work

Interview with Frank Petraglia

<p>Short summary of your stay</p>	<p>I really enjoyed my stay. I found the research I was doing very interesting and I made a lot of friends that were from all over the world. I had the chance to travel with these friends all over Europe and learn about various cultures.</p>
<p>Which projects did you complete?</p>	<p>I wrote plugins for ImageJ to perform image analysis on OCT images to measure various parameters of wound healing.</p>
<p>How did the work you completed in Hannover help you with your studies?</p>	<p>I learned valuable programming skills in Java and image analysis techniques that I was able to apply to projects and assignments during my studies.</p>
<p>Would you participate in the exchange again? If yes, why? If no, why not?</p>	<p>Yes, absolutely. I learned a lot of valuable skills that I could apply to my studies. Also, I made a lot of friends and got to travel around Europe and learned a lot about different cultures.</p>



The Future of the Program

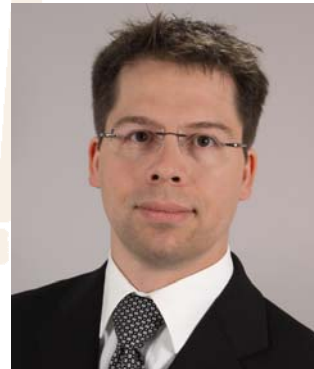
Professor Witte aims to extend the program so that German students are going to have the opportunity to visit laboratory facilities in the United States as well. The United States leadership team, represented by Professor Sankar and Professor Borovetz, has expressed their welcomes to the German team and their students. Invitations have been extended and all parties involved are looking forward to conducting a student and researcher exchange on a regular basis.

However, in order to promote the international exchange program and the partnership with the US institutions, Professor Witte has to rely on stipends and scholarship donations for his students. He hopes that in the future, it will be possible to create an exchange program that will allow the students of Hannover Medical School, Germany and the partnering US institutions to visit each others lab facilities' on a regular basis.

Professor Witte's team and the ERC-RMB Satellite Manager work closely together to provide all the support needed to facilitate students an international research experience and to all researchers gaining more information about the program.

If you have questions, please contact the Hannover Satellite.

Professor Frank Witte, MD
Director of Biomaterial Research
Laboratory for Biomechanics and Biomaterials
Biocompatibility and Implant-Immunology
Hannover Medical School
Anna-von-Borries-Str.1-7
30625 Hannover
Germany
T: (+49) – (0)511-532-8961
Mail: Witte.Frank@mh-hannover.de



Dorothee-Catherine Wengelnik, MBA
ERC-RMB Satellite Manager
Hannover Medical School
Feodor-Lynen Str. 31
30625 Hannover
Germany
T: (+49) – (0)511-532-8808
Mail: Wengelnik.Dorothee-Catherine@mh-hannover.de

