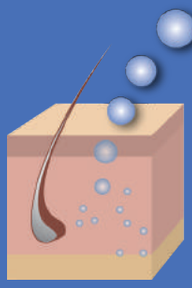


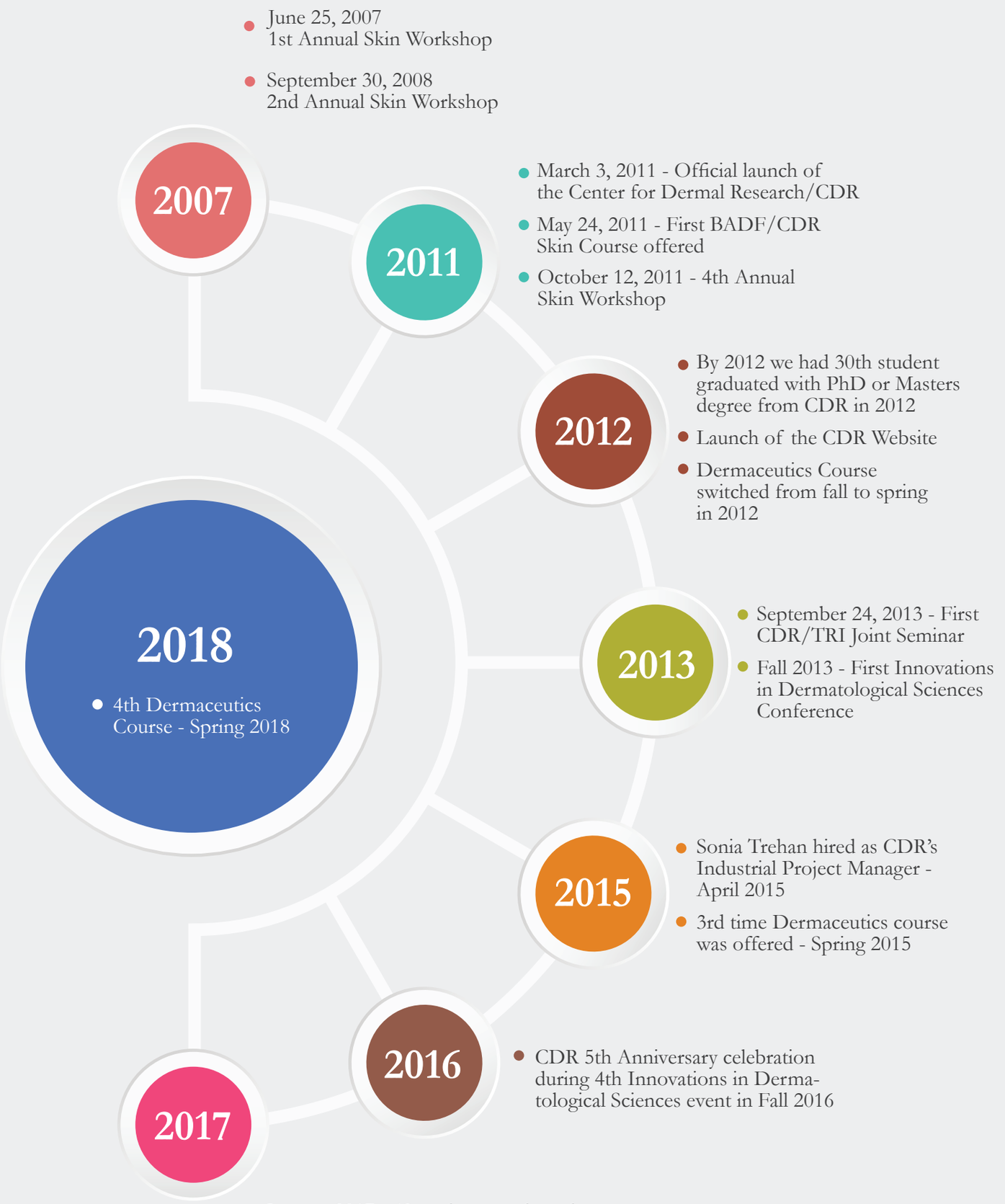
5th Anniversary

CENTER FOR DERMAL RESEARCH

2016 ANNUAL REPORT

RUTGERS
THE STATE UNIVERSITY OF NEW JERSEY

New Jersey Center for Biomaterials


2007
June 25, 2007
1st Annual Skin Workshop
September 30, 2008
2nd Annual Skin Workshop
2011
March 3, 2011 - Official launch of the Center for Dermal Research/CDR
May 24, 2011 - First BADF/CDR Skin Course offered
October 12, 2011 - 4th Annual Skin Workshop
2012
By 2012 we had 30th student graduated with PhD or Masters degree from CDR in 2012
Launch of the CDR Website
Dermaceutics Course switched from fall to spring in 2012
2013
September 24, 2013 - First CDR/TRI Joint Seminar
Fall 2013 - First Innovations in Dermatological Sciences Conference
2015
Sonia Trehan hired as CDR's Industrial Project Manager - April 2015
3rd time Dermaceutics course was offered - Spring 2015
2016
CDR 5th Anniversary celebration during 4th Innovations in Dermatological Sciences event in Fall 2016
2017
January 2017 - 42 students graduated with PhD or Masters degree
April 24, 2017 - First CDR/Colgate Palmolive Joint Seminar
2018
4th Dermaceutics Course - Spring 2018

5th Anniversary

CENTER FOR DERMAL RESEARCH

The New Jersey Center for Biomaterials, 145 Bevier Road, Suite 101
Piscataway, New Jersey 08854 - Tel: 848.445.3589

The past year has been one of the most exciting since the Center for Dermal Research (CDR) was officially introduced to the scientific community in the tri-state area. March 2016 marked five years since we cut the red ribbon to celebrate the founding of our Center and selected our first CDR Sponsor of the Year - Avon Products.

Throughout our five years of existence, we offered numerous CDR seminars, workshops, conferences, training sessions, skin courses, clinical roundtables, and webinars, and recorded many of these for our audio library. Our annual conference has grown from a successful Annual Skin Workshop with about 100 attendees, held at our home site, the Life Sciences Building, into a two day Symposium entitled: Innovations in Dermatological Sciences. It is now held at a local NJ hotel and has over 200 attendees!

We began offering a joint CDR-TRI Princeton series of seminars in 2013. In 2016 we offered a joint Skin Course- "Advances in Skin Science, Measurement and Treatment" at TRI in their Princeton headquarters.

We have always received wonderful support from our industrial members (pharma [brand and generic], personal care, excipient suppliers and cosmetic) both as CDR Members and as event sponsors. We have had 40 companies over the last 5 years join us as CDR members and received conference support from 14 companies/foundations totaling over $145,000.

Our research laboratory has also grown over the last five years. We started with 10 members and by 2016 there were around 30 including, graduate students, visiting scientists, lab managers, undergraduate and international students. Over the past five years, my research group has graduated 13 PhD and 4 Masters students all of whom have full-time positions, primarily in the pharmaceutical industry but also elsewhere, including personal care companies and the FDA.

In 2016 we worked on 15 industrial projects ranging from small studies (less than $10K) to large service and research agreement contracts. As these collaborations expanded, the CDR hired Dr. Sonia Trehan, who came to us with over 14 years of experience in the pharmaceutical industry. She is now the full-time manager for all of our industrial projects.

The highlight of last year was our two-day symposium, entitled "Innovation in Dermatological Sciences: Delivery of Actives to Skin". This was a special event for several reasons: this was the fifth anniversary of the CDR, it was the first time we were offering a two-day rather than one day event, and we invited speakers who had made significant and historical contributions to the skin research area. These speakers included the inventor of the Franz Diffusion Cell, Dr. Tom Franz (now retired) who spoke about "The in vitro Permeation Test: What Have We Learned After 50 Years"; Dr. Gary Cleary of Cape Therapeutics who was part of the team that brought the first transdermal patches to market (scopolamine and nitroglycerin); and Dr. Philip Wertz (University of Iowa) who is an expert in the areas of stratum corneum lipids and skin barrier function, just to name a few.

During our anniversary celebration we presented the CDR Sponsor of the Year award to BASF. This award was given to Nigel Langley and Norman Richardson. Thank you for your continued support!

In 2017, the CDR will be busy; offering a full calendar of seminars, starting with a new joint seminar series with Colgate-Palmolive, and hosting our annual symposium which will focus on "Harnessing the Skin Microbiome" on October 2-3, 2017.

My CDR team and I wish all of our supporters, industrial members, and professional colleagues a healthy and happy New Year and look forward to seeing you soon at one of our 2017 events!

5th Anniversary
CENTER FOR
DERMAL RESEARCH

CDR Membership Program

This year we expanded our CDR Advisory Council to include the following members:

Abhijit Bidaye - Croda
Angela Christiano - Dermatology, Columbia University
Gary Cleary - Gary Cleary - Cape Therapeutics, Inc.
Adam Friedman - George Washington School of Medicine and Health Sciences
Vince Gruber - Sensient
William Ju- Advancing Innovation in Dermatology, Inc.
Peter Landa - TRI Princeton
John Lyga - Avon
Gopi Menon - Ashland
Amy Pappert - Rutgers - RWJ Medical School
Miri Seiberg - Seiberg Consulting

The Center for Dermal Research offers pharmaceutical, personal care, cosmetic and other companies an opportunity to participate in its programs and meetings. Membership affords companies and their key employees opportunities to learn about the latest developments at the Center for Dermal Research at Rutgers and to meet scientists and researchers who are making progress in developing new concepts and products in the science. Through their participation members also have the opportunity to contribute to the research that is being conducted by the Center.

Double-Diamond Level *($50,000).* The membership affords companies with more say in how their membership funds are spent and grants them further access to resources at the CDR.

- Sponsor a student or graduate student who will present a talk at the company once a semester (two presentations per membership year)
- Opportunity for an employee to shadow a Lab Tech or Researcher for a week
- Attendance for two new employees at a lab training session
- Two seats on the CDR Advisory Board
- Six attendees at CDR events held through the membership year
- 1/2 day per month face time with Dr. Bozena Michniak-Kohn and/or key lab members
- Two seats on CDR Program Committees
- Full access to Archived Lectures
- Your company will be able to present an exhibit at most events, your company representative will have the opportunity to present a 15-minute talk to the attendees, and your company logo will also be featured prominently in all meeting and event marketing materials.
- Special seating at the VIP table during the reception with CDR leadership and speakers of the evening.

BASF The Chemical Company · TRI Princeton Research Education Service · The NeoStrata Company · AVON · KGL Skin Study Center · presperse · AkzoNobel Tomorrow's Answers Today · MERIAL A SANOFI COMPANY

Jon Anderson-Actives International
Nava Dayan-Skin Science & Research
Robert Falcone
Joanne Gere-Biopharma Research Council

GENEMARKERS

William Ju-Advancing Innovation in Derm
Amy Pappert-Rutgers-RWJ
Meyer Rosen-Interactive Consulting

Kishore Shah-Polytherapeutics, Inc.
Miri Seiberg-Seiberg Consulting
Paul Thau-PaCar Tech
Joe VanDyk-Clinical Research Laboratories

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CDR Membership Program

Diamond Level *($20,000).* This member level opens up a whole new realm of opportunities and level of involvement for members of the CDR.

- One seat on the CDR Advisory Board
- Six attendees at CDR events held through the membership year
- 1/4 day per month face time with Dr. Bozena Michniak-Kohn and/or key lab members
- One seat on CDR Program Committees
- Full access to Archived Lectures
- Your company will be able to present an exhibit at most events, your company representative will have the opportunity to present a 10-minute talk to the attendees, and your company logo will also be featured prominently in all meeting and event marketing materials.
- Special seating at the VIP table during event reception with CDR leadership and speakers of the evening.

Platinum Level (*$5000*). Your company will be able to present an exhibit at most events, your company representative will have the opportunity to present a 5-minute talk to the attendees, and your company logo will also be featured prominently in all meeting and event marketing materials. Attendance of up to four company representatives at reduced or no cost for all CDR events held through the membership year. * In addition, special seating at the VIP table during the reception with CDR leadership and speakers of the evening.

Gold Level (*$2500*). Your company will be able to present a tabletop exhibit at most events and your company logo will also be featured in all meeting and event marketing materials. Attendance by up to two company representatives at reduced or no cost for any CDR event held through the membership year.

Silver Level (*$1000*). Your company's logo will be featured in all meeting and event marketing materials. Attendance by one company representatives at any CDR event held through the membership year at reduced or no cost.

Individual Memberships (*$250*). Attendance at any CDR event held through the membership year at reduced or no cost.

BASF The Chemical Company · TRI Princeton Research Education Service · The NeoStrata Company · AVON · KGL Skin Study Center · presperse · AkzoNobel Tomorrow's Answers Today · MERIAL A SANOFI COMPANY

Jon Anderson-Actives International
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Paul Thau-PaCar Tech
Joe VanDyk-Clinical Research Laboratories

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CURRENT LAB MEMBERS

Graduate Students

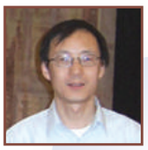
Dina Ameen, PhD Student
Research Interests:
- *transdermal delivery of anti-Alzheimer's disease drugs*
- *formulation of nanostructured lipid carries for transdermal and dermal drug delivery*

Ben Goodyear, part time PhD Student
Research Interests:
- *formulation development for topical and transdermal drug delivery systems*
- *polymeric drug delivery systems*
- *oral dissolvable thin films*

Vinam Puri, PhD Student
Research Interests:
- *transungual drug delivery*
- *novel visualization techniques for nail penetration*
- *anti-fungal and acne therapy*

Parin Shah, PhD Student
Research Interests:
- *formulation development, evaluation and optimization of topical drug delivery*
- *drug delivery technology, preformulation studies and development of topical formulations*

Anika Haq Alam, PhD Student
Research Interests:
- *nanotechnology and drug delivery*
- *development and analysis of human skin equivalents*
- *diffusion studies of drugs and different permeation enhancers across human skin and their human equivalents*
- *drug formulation*



Peter Zhang, part time PhD Student
Research Interests:
- *microemulsion formulations*
- *topical drug delivery optimization*

Julia Zhang, part time PhD Student
Research Interests:
- *transdermal drug delivery systems*
- *preformulation studies*

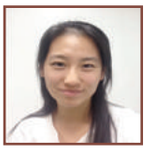
Amitkumar Virani, part time PhD Student
Research Interests:
- *nano particle drug delivery*
- *transdermal delivery and topical formulations*

Rose Soskind, PhD/PharmD
Research Interests:
- *topical drug delivery*
- *nanosphere drug delivery*
- *molecular biology of skin*

Masters Students

No photo available

Khilat Abbas, PharmD Student
Research Interests:
- *topical dosage forms*
- *delivery of natural actives to skin*



Yae Eun Chong, PharmD Student
Research interests:
- *transdermal drug delivery*
- *topical dosage formulations and technology*

Jason Darr, PharmD Student
Research Interests:
- *topical dosage forms*
- *targeted delivery to skin layers*

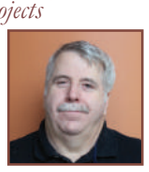
Roshni Shibad, PharmD Student, Student Assistant
Research Interests:
- *enhancement of transdermal drug delivery to treat photosensitivity*
- *polymer drug delivery techniques*
- *extended-release transdermal systems*

Staff

Louli Kourkounakis
Program and Event Coordinator

Suzanne Squires
Outreach Specialist

Sonia Trehan, PhD
General Manager of CDR Industrial Projects



John Watkins
IT Specialist

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CDR INTERNS AND INTERNATIONAL VISITORS

Interns

Carlos Wilfredo Contreras-Avilés, MBS-Personal Care Science
Research Interests:
- skin care product development and formulation
- transdermal delivery systems for natural products
- topical interaction between sunscreen actives and hydroxy-acids

Nackchun Kim, MBS-Personal Care Science
Research Interests:
- formulation development for the skin care actives delivery
- evaluation of the topical formulations to improve efficacy and minimize toxicity

Danielle Kadish, MBS Personal Care Science
Research Interests:
- formulation of personal care products
- formulation development for the topical and transdermal delivery of novel actives

Imani Nicholson, MBS Personal Care Science
Research Interests:
- in-vitro permeation and penetration studies

Nidhi Shah, MBS Personal Care Science
Research Interests:
- formulation development of personal care products

International Visitors

Caroline Mellac, Nice, France
Research Interests :
- formulation development for topical delivery of natural compounds
- development of personal care products

Arianna Cozzi, Pavia, Italy
Research Interests:
- imaging of skin and hair
- FTIR and Raman spectroscopic techniques
- imaging effects on formulations (sunscreens) in skin layers

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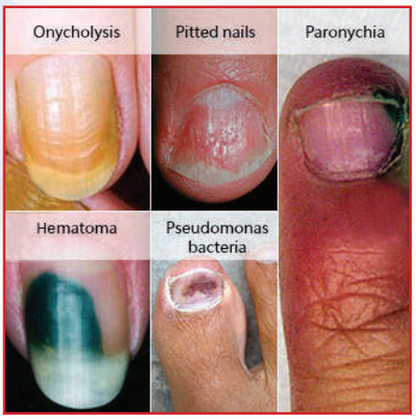
ADDITIONAL NEW FOCUS FOR CDR: NAIL RESEARCH

With foregoing successful years in topical and transdermal delivery, the Center for Dermal Research is now expanding its focus towards another challenging field of delivery: nail (transungual) drug delivery. Transungal local delivery is desirable when treating nail diseases due to localized effects with minimum systemic side effects. However, the effectiveness of topical therapies is limited by low drug permeability through the highly keratinized compact nail plate.

There are different approaches to nail delivery which include chemical means of increasing penetration through nails, physical means and electrochemical. Approximately, one half of all nail conditions are the result of fungus, making onychomycosis one of the most common nail disorders. Onychomycosis affects approximately 35 million Americans and currently 85% of these patients are untreated since currently prescribed oral anti-fungal medicines cause serious side effects such as liver damage. Therefore, there is significant need for effective local drug delivery through nails for treatment of onychomycosis and other nail disorders such as nail psoriasis, yellow nail syndrome, paronychia, pitting of nails and hyperkeratosis. The Center for Dermal Research is well equipped for formulation design, development and transungual permeation studies and has access to facilities for microscopic examination (e.g. confocal microscopy and spectroscopic imaging of the nail plate). We are now focusing on novel approaches for enhanced nail delivery for efficient treatment of nail disorders and evaluating their perungual drug absorption following topical application.

Healthy Nails

Source:http://www.myhealthtips.in/2013/10/top-15-superfoods-for-healthy-nails.html (Top 15 Superfoods For Healthy Nails By sharib on October 23, 2013)

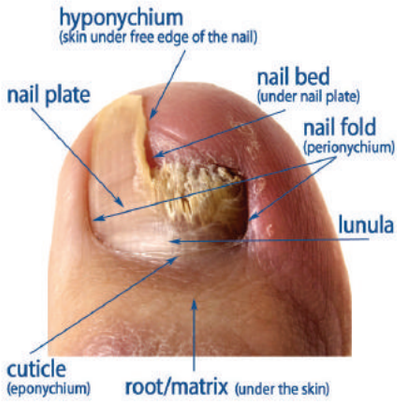


Diseases of Nails

Source: http://www.medicinenet.com/fungal_nails/page2.htm (Fungal Nails, Medical Author: Kyoung Min Han, DPM, AACFAS, Medical Editor: Melissa Conrad Stöppler, MD)

Nail Adapters for in-vitro perungual drug absorption studies

Source: http://permegear.com/nail-adapters/



Nail Anatomy

Source: http://www.nailandtoe.com/wordpress/wp-content/uploads/2010/05/nail_anatomy_chart1.png

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TRI Skin Course

TRI organized and held a two-day course on "Advances in Skin Science, Measurement and Treatment" in Princeton on September 27 and 28. Over 60 people attended, including speakers, TRI staff, and instrument vendors to showcase their measurement equipment. The early feedback from all participants, instructors, and instrument showcase providers has been very positive, and it is in no small measure thanks to all of our organizers and contributors.

This course was developed with the aim of providing a broad perspective into Skin Science and then to elucidate current understanding and research in skin properties and physiology along with the techniques used to measure the impact of products and treatments on the skin. We plan to offer a similar course in Fall 2017.

The lecturers were:

Bo Michniak-Kohn - Center for Dermal Research-Rutgers, The State University of New Jersey

Apostolos Pappas - Johnson & Johnson

Mike Southall - Johnson & Johnson

Curt Cole - Sun & Skin Consulting, LLC

Eduardo Ruvolo - Bayer Consumer Health, LLC

Laurie Joseph - Rutgers, The State University of New Jersey

Paulo Bargo - Janssen Pharmaceutical Companies of Johnson & Johnson

Bob Imhof - Biox Systems, Ltd.

Mark Chandler - ACT Solutions Co.

Samuel Gourion-Arsiquaud - TRI Princeton

Phil Cummins - Estee Lauder - retired

From left to right: Aposolos Pappas, Eduardo Ruvolo, March Chandler, Laurie Joseph, Peter Landa and Bob Imhof

From left to right: Phil Cummins, Bob Imhof, Laurie Joseph, Samuel Gourion-Arsiquaud, Peter Landa, and Paulo Bargo

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MICROSTRUCTURE WORKSHOP

On **May 24, 2016** the Center for Dermal Research (CDR) and BASF Pharma Solutions jointly sponsored a full-day workshop on the characterization of topical semi-solid microstructure and critical quality attributes. More than 80 representatives from pharmaceutical companies in the northeast (and beyond) attended the event. The day started with an overview on the significance of the topic by Dr. Sam Raney (FDA) and a presentation on proposed critical quality attributes, measurement methods and their application to topical Acyclovir creams by Dr. Narasimha Murthy (Univ of Mississippi). Norman Richardson (BASF) reported on studies that demonstrated the influence of excipient selection on the microstructure of creams, followed by Michael Lowenborg (DPT Laboratories) who highlighted the impact of processing on semi-solid microstructure. Dr. Padam Bansal (Amneal) explained how an understanding of the Q3 can be helpful to the generic product development process. Dr. David Osborne explained how the diffusion of a drug through a tube of product can be influenced by the microscopical features of the ointment or cream base.

The presentations were followed by a panel session which included all the speakers with the addition of Dr. Gareth Winckle (Galderma). Discussion about the importance of characterizing the complexity of phases, excipient and API solid states, assembled nano- and micro-structures, oil droplets, fluid states, API solubilization and other attributes of the heterogeneous milieu that we call the Q3, elicited great interest and demonstrated the importance of this topic to topical drug formulators, researchers and regulators.

At the conclusion of the discussions a question was raised about how we would be able to continue the dialogue and also document the research that is being done in this area. Dr. Nigel Langley (BASF) proposed the organization of a "Microstructure Working Group" that would include members from industry and academia. As a result, such a group is now being facilitated by CDR and has begun meetings and discussion.

Panel Discussion

From left to right: Sam Raney, Padam Bansal, Norman Richardson

5th Anniversary
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2016 INNOVATIONS IN DERMATOLOGICAL SCIENCES

"DELIVERY OF ACTIVES TO SKIN"

Our fourth annual conference on dermatology took place on Thursday and Friday, September 29-30, 2016 at the Renaissance Woodbridge Hotel in Iselin, NJ. The theme of this year's conference was "Delivery of Actives to Skin". Throughout the two-day program speakers addressed the challenges involved in delivery of actives to skin followed by presentations of the latest topical and transdermal delivery techniques. The event was videotaped and most speakers' lectures are available for viewing. Contact us at **cbmfrontdesk@dls.rutgers.edu** for more details.

Samir Mitragotri, PhD, Professor, Department of Chemical Engineering and Director of UCSB's Center for Bioengineering, University of California Santa Barbara, *Ionic Liquids for Skin Applications*

Thomas J. Franz, MD, retired, formerly of Cetero Research, *The In Vitro Permeation Test: What Have We Learned After 50 Years*

Ajay Banga, PhD, Mercer University, *Enabling Technologies for Dermal Delivery of Macromolecules*

Angela Christiano, Columbia University, *"Genetics, Immunology and Targeted Therapies for Alopecia Areata"*

Christian Surber, PhD, Professor, Departments of Dermatology, University Hospitals Basel and Zürich, Switzerland, *Vehicles Matter*

Ronald Nardi, PhD, Scioderm, an Amicus Therapeutics Company, *Epidermolysis Bullosa Clinical Development Program*

Vijendra Nalamothu, PhD, CEO and Co-Founder, Tergus Pharmaceutical, *Semisolid Drug Product Critical Process Parameters, Material and Quality Attributes: Linking Innovation With Clinical De-Risking*

Vivek Joshi, PhD, GlaxoSmithKline, *Utility of Strat-M Membrane for Formulation Optimization in Transdermal Diffusion Testing*

Philip Wertz, PhD, Professor, University of Iowa and the Dows Institute, *Essential Fatty Acids in General Health and the Epidermis*

Andrew Tadros, BS, Georgia Tech - STAR *Microneedle Particles for Drug Delivery to Large Surface Area Tissues*

SHIELD Panel (Nestle Skin Health) **Warren J Winkelman**, MD, PhD, MBA, FAAD, **Nathan Ie**, BS, **Peter Leger**, BSc, **Aaron Windfield**, BASc, *Breathing Life into Dreams: Lessons from Early Health Tech Start-Ups*

5th Anniversary
CENTER FOR DERMAL RESEARCH

PROGRAM COMMITTEE

Bozena Michniak-Kohn, Rutgers University - CDR
Francois Berthiaume, Rutgers University
Stephen J. Carter, Rutgers University
Angela Christiano, Columbia University
Louli Kourkounakis, Rutgers University - CDR
Peter Landa, TRI Princeton
John Lyga, Avon
Samir Mitragotri, University of California, Santa Barbara
Amy Pappert, Rutgers University - RWJMS
Miri Seiberg, Seiberg Consulting, LLC
William Ju, Advancing Innovation in Dermatology, Inc.

Reinhold Dauskardt, PhD, Ruth G. and William K. Bowes Professor and Associate Department Chair, Stanford University, *How Actives and Formulations Affect the Biomechanical Function, Feel and Firmness of Skin*

Gary Cleary, PhD, Cape Therapeutics, Inc., *From The Jungle, Yucca Plants and Yams to Transdermal Patches*

Michael Southall, PhD, Johnson & Johnson, *Topically Applied Ceramide Accumulates in Skin Glyphs: Challenges in Delivery of Skin Lipids*

Frank Liebel, BS, Principal Scientist, Clinical Efficacy, Avon, *Assessment of Epidermal Proliferation Using UV Fluorescence Excitation Spectroscopy*

Samuel Gourion-Arsiquaud, PhD, TRI Princeton, *Vibrational Spectroscopy and Imaging Methods Relevant to Monitor Transdermal Agent Delivery as Well as Analyze Their Impact on Skin Barrier Functions*

David Osborne, PhD, Retired, formerly of Tolmar, Inc. *Skin Delivery of Actives from Topical Formulations Containing Diethylene Glycol Monoethyl Ether*

Amy Ethier, PhD, BASF Corporation, *Understanding the Role of Functional Excipients in Dermal Drug Delivery*

Bozena Michniak-Kohn, PhD, Director, Center for Dermal Research-Rutgers University *Adapalene-loaded Tyrospheres for Treatment of Acne*

Pierre Seroul, PhD, Newtone, *Complexity of Facial Skin Hydration of Different Ethnic Groups Visualized by Novel 3D and 2D Color Mapping Approaches and the Effect of a Moisturizer*

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GUESTS HONORED AT THE RECEPTION

On the first evening at this year's Innovations in Dermatological Sciences we held a reception to celebrate our 5th year anniversary. At the reception several attendees were honored with plaques for their continued support and involvement in the CDR.

There were two people who were not present at the reception to receive their awards but we cannot forget their contributions! They are *Jules Mitchell* (Target Health) and *Kishore Shah* (Polytherapeutics).

Angela Christiano of Columbia University receiving her award

William Ju of Advancing Innovation in Dermatology receiving his award

Miri Seiberg of Seiberg Consulting LLC receiving her award

Otto Mills, Founder and Director of Basic and Applied Dermatology Forum receiving his award

5th Anniversary
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VISITING SCIENTISTS

Daphne Benderly, PhD, Senior Applications Scientist, Presperse Corporation

Daphne Benderly has over 20 years' experience in industrial R&D, among others in the personal care, specialty chemicals, and plastics industries. She is an active member of the Society of Cosmetic Chemists and the Society of Plastics Engineers. She has authored publications, book chapters and patent applications, and has presented her work at national and international conferences.

She currently holds a position as a Visiting Scientist at the New Jersey Center for Biomaterials and Center for Dermal Research at Rutgers – The State University of New Jersey. The collaborative work between Presperse and CDR - Rutgers is aimed at quantifying the performance of raw materials used in personal care products, leading to better product design and claims substantiation.

Kavita Beri, MD, Medical Director, BE Skin & Laser Med Spa, Jersey Shore University Medical Center

Dr. Beri is a Board Certified Physician in the USA and an active member of the American Society of Laser Medicine and Surgery. She is also the Medical Director and owner of an Aesthetic Anti-Aging Medical Spa practice in NJ.

She currently holds a position as a Visiting Scientist at the New Jersey Center for Biomaterials and Center for Dermal Research at Rutgers - The State University of NJ. She is also an active staff member in the Department of Medicine in Jersey Shore University Medical Center.

She holds two research patents and has presented at several international regenerative medicine conferences. She holds a Distinction in Biochemistry and has contributed to several publications. Her passion is research in the regenerative medicine field of tissue engineering with stem cells combined with lasers, including cancer stem cells and medicinal properties of plant stem cells in wound healing and skin regeneration. She holds a strong interest and is a follower of yoga science and Vedic philosophy and its influence on scientific research.

Samuel Gourion-Arsiquaud, PhD, spectroscopist from TRI, Princeton NJ. Spring 2015-present.

Samuel Gourion-Arsiquaud is using various spectroscopic and microscopic techniques for the characterization and the analysis of modifications in biomaterials associated with specific conditions like aging, disease, environmental stress or chemical treatment (product application or drug therapy).

Dr. Gourion-Arsiquaud's expertise lies in multiple biophysical techniques with a special emphasis on vibrational spectroscopies (FTIR & Raman) for biomaterial sciences; bone, teeth, nail, hair and skin. He has more than 10 years of research experience, including technique development, project design and coordination, as well as a successful track record of achievements.

After a doctorate in Biochemistry/Biophysics (France), he began his career at the Hospital for Special Surgery (HSS/Cornell University) studying the mechanisms of biomineralization in bone and teeth. Then, he became associate researcher at Rutgers University, where he examined the structural and functional analysis of lipid/protein interactions involved in the host - defense mechanism, as well as the biophysical aspects of skin to understand its physiological barrier function.

Since 2011, Dr. Gourion-Arsiquaud joined TRI where he is developing innovative tests, research areas and product evaluations relevant to cosmetic sciences and material analysis; from technology development to product design and performance evaluation on hair, nail and skin care products.

5th Anniversary
CENTER FOR
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VISITING SCIENTISTS

Michael Liu, PhD, VP for Regenerative Dermatology, Zymeron Corporation, Research Triangle Park, NC

Dr. Liu received his PhD degree from New York University. His research efforts for Regenerative Dermatology apply strategies in Regenerative Medicine to provide innovative products and enabling technologies for skin regeneration by combining expertise and know-hows in biologics, biopolymers, and tissue engineering.

Prior to joining Zymeron, Dr. Liu worked at the Center for Advanced Research and Technology of KCI USA Inc. KCI is one of the largest companies developing wound caring products in the world. Over the past twenty years, he developed over 10 patents and has 25 peer-reviewed publications. He currently holds a position as a Visiting Scientist at the New Jersey Center for Dermal Research at Rutgers-The State University of NJ.

Komal Shahani, PhD, Lead Applications Scientist - Healthcare, Croda Inc., New Castle, DE. October 2016 - Present

Komal Shahani is a Formulation Scientist with several years of experience in personal care and health care industries. She currently holds a position as a Visiting Scientist at the Center for Biomaterials and Center for Dermal Research at Rutgers - The State University of NJ. She is also a member of the American Association of Pharmaceutical Scientists (AAPS).

She has authored several publications, and presented at many local and international conferences. She is passionate about research in the area of colloidal drug delivery systems, including nanoparticles, microparticles and liposomes. She is also interested in research on topical and transdermal drug delivery.

Natalya Shub, ME, Sr. Scientist I, Merial, now part of Boehringer Ingelheim.

Natalya Shub currently holds a position as a Visiting Scientist at the New Jersey Center for Biomaterials and Center for Dermal Research at Rutgers – The State University of NJ.

Her responsibilities at Merial include development of new formulations for topical, oral, injectable delivery for animal health.

She is an inventor on nine patent applications, five granted in the US.

Arsalan Khan, Application Scientist, Health Care, Croda Inc.

Arsalan Khan is currently a visiting scientist at the Center for Biomaterials, working alongside Dr. Sonia Trehan under the guidance of Dr. Bozena Michniak-Kohn.

Arsalan completed his Bachelors of Science in Chemical Engineering and Masters of Science in Pharmaceutical Engineering from the New Jersey Institute of Technology. He has experience in formulation development in both Health Care and Agrochemicals, and currently works as an applications scientist at Croda Inc, where he helps drive new product development and generate new data for product applications for the Health Care market. Outside of work, Arsalan is an avid writer, tennis player, and fitness trainer.

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More from the Microstructure workshop

From left to right: Padam Bansal, Norman Richardson, Gareth Winckle

CDR Seminars 2016

From left to right: Otto Mills, Bozena Michniak-Kohn, Harry Fallick

From left to right: Bozena Michniak-Kohn, Manasi Chavan

From left to right: Christine Heimer, Bozena Michniak-Kohn

From left to right: Bozena Michniak-Kohn, Donald Schaffner, Otto Mills

CDR Gatherings 2016

Holiday Dinner

Summer picnic at Dr. Michniak's house

Farewell party for Carlos (Willy) Contreras-Aviles

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CALENDAR OF CDR 2016 EVENTS

January 18th - CDR Seminar Series, *joint with TRI Princeton,* **Mark Chandler,** ACT Solutions Corp, *"Emulsions and Their Impact on Sensory, Formulation, Deposition And Delivery Systems"*

February 8th -CDR Seminar Series, **Manasi Chavan**, BASF, *"Age and UV Exposure- Associated Changes in Skin Elasticity"*

March 1st - SEMINAR, **Anne Marie Api,** *"The RIFM Human Health Science Program"*

March 14th - CDR Seminar Series, **Amy Ethier,** BASF, *"Excipient Selection and the Effect on Performance and Physical Properties of Semi-Solids"*

April 6th - The Rutgers Masters of Business and Science Program and the Center for Dermal Research at Rutgers University meeting providing a unique opportunity for students to learn about varied careers in the field of personal care science.

April 18th - CDR Seminar Series, joint with TRI Princeton, **Angela Christiano,** Columbia University, *"Efficacy of JAK Inhibitors in the Treatment of Alopecia Areata"*

May 24th - Annual Skin Workshop co-hosted with BASF, *"Topical Semi-solid Microstructure and its Significance in Formulation Performance and Efficacy"*

June 20th - CDR Seminar Series, joint with TRI Princeton, **Kavita Beri,** BE Skin & Laser Med Spa, Jersey Shore University Medical Center, at TRI, *"Epidermal Stem Cells, and the Role of Stem Cells in Wound Healing"*

September 12th - CDR Seminar Series, **Serom Lee,** BME-Rutgers University, *"An In Vitro Approach to Identify Skin Sensitizers"*

September 27-28th - TRI Skin Course, *"Advances in Skin Science, Measurement and Treatment"*

September 29-30th - Innovations in Dermatological Sciences, *"Delivery of Actives to Skin"*

October 13th - BADF event, **Harry Fallick,** *"How Do We Define Cosmeceuticals?"*

November 7th - CDR Seminar Series joint with TRI Princeton, **David Moore,** GSK, *"Biophysical Studies of Stratum Corneum Lipid Organization and Barrier Function - Changes Induced by pH, Surfactants and Temperature"*

December 1st - BADF event, **Donald Schaffner**, Rutgers University, *"Viewing Handwashing and Hand Sanitizers From the Perspective of a Food Microbiologist"*

December 15th - CDR Seminar Series, **Robert Falcone,** *"Personal Care Product Development - Considerations on How to Avoid Pitfalls"*

LOOKING AHEAD TO 2017

January 30th / *CDR Seminar Series* - Patricia M. Brieva, PhD
February 15th / *CDR Seminar Series* - Joanna Jacków
February 27th / *CDR Seminar Series joint with TRI Princeton* - Samuel Gourion Arsiquaud, TRI Princeton
March 13th / *CDR Seminar Series* - Peter R. Hilliard, Colgate Palmolive
April 24th / *CDR Seminar Series joint with CP* - Aixing Fan, Colgate Palmolive
April 25th / *BADF event* - Steve Herman, Diffusion, LLC
May 15th / *CDR joint Seminar* - Zsolt Szabados, Presperse
May 22nd / *CDR Seminar Series* - David B. Lebo, Temple University
June 5th / *CDR Seminar Series* - Michael Koganov, Ashland Inc.
September 25th / *CDR Seminar Series* - Hilary Baldwin
October 2nd-3rd / Innovations in Dermatological Sciences: Harnessing the Skin Microbiome
October 16th / *CDR Seminar Series* - Ilya Raskin, Rutgers
November 13th / *CDR Seminar Series* - Angelike Galdi, L'Oreal
December 6th / *CDR Seminar Series* - Bill Welsh, Rutgers

EACH YEAR THE CENTER FOR DERMAL RESEARCH HOSTS MANY EVENTS. THESE INCLUDE:

- Seminars throughout the year that feature new speakers with an array of exciting topics
- The annual Innovations in Dermatological Sciences Symposium
- Featured events jointly hosted with TRI Princeton and the Basic and Applied Dermatology Forum
- Dermaceutics course held once every three years, and training sessions

MORE TO COME

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2016 PUBLICATIONS:

1) Karry, K., Susarla, R., Krull, S.M., Li, M., Biligili, E., Dave, R. N., Michniak-Kohn, B. Development of biorelevant in vitro dissolution protocols for oral transmucosal (transoral) polymer films containing naproxen nanoparticles. Int. J. Pharm., 2016. Submitted.

2) Dorrani, M., Garbuzenko, O., Minko, T., Michniak-Kohn, B. Development of edge-activated liposomes for siRNA delivery to human basal epidermis for melanoma therapy. Journal of Controlled Release (2016), 228, 150-158. PMID 26965957.

3) Montiero e Silva, S.A., Michniak-Kohn, B. , Leonardi, G. R. An overview about oxidation in clinical practice of dermatology. Anais Brasileiros de Dermatologica (2016), in press.

4) Ramezanli, T., Zheng, Z., Michniak-Kohn, B. Development and characterization of polymeric nanoparticle-based formulation of adapalene for topical acne therapy. J. of Nanomedicine: Nanotechnology, Biology and Medicine (2016), doi: 10.1016/j.nano.2016.08.008.

5) Palma, F., Michniak-Kohn, B., Perez-Correa, J.R., Hernandez, E., Romanach, R., Valenzuela, L.M. NIR-CI application to characterize the mechanical properties of chitosan-gelatin edible films. Carbohydrate Polymers (2016), 136, 409-417; http://dx.doi.org/10.1016/j.carbpol.2015.09.051. PMID 26572371.

6) Hernandez, E., Pawar, P., Keyvan, G., Wang, Y., Velez, N., Callegari, G., Drazer, G., Cuitino, A., Michniak-Kohn, B., Muzzio, F., Romanach, R.J. Prediction of dissolution profiles by non-destructive near infrared spectroscopy in tablets subjected to different levels of strain. Journal of Pharmaceutical and Biomedical Analysis, 2016, Jan 5th, 117, 568-576. PMID 26604167.

7) Ramezanli, T., Kilfoyle, B. Zhang, Z., Michniak-Kohn, B. Polymeric nanospheres for topical delivery of Vitamin D3. International Journal of Pharmaceutics, 2016, http://dx.doi.org/10.1016/j.ijpharm.2016.10.072 and (2017), 516, 196-203.

BOOK CHAPTERS:

1) Tsai, P., Tamezanli, T., Wadie, D., Trehan, S., Martos, N., Zheng, Z., Michniak-Kohn, B. Selection considerations for membranes and models for in vitro-ex vivo permeation studies. In "Dermal Drug Delivery Systems: From Innovation to Production", 2nd Edition edited by Ghosh, Tapash, CRC Press, Inc. (2016).

2) Ramezanli, T., Zhang, Z., Karry, K. Shah, K., Michniak-Kohn, B. "Transdermal delivery of drugs using patches and patchless delivery systems" in "Drug Delivery: Principles and Applications". Editors: Wang, B., Hu, L. & Siahaan, T. Wiley Series in Drug Discovery and Development, Wiley Press, US., 2015. In press.

3) Michniak-Kohn, B., Ramezanli, T., Dorrani, M., Shah, K., Romanski, F., Milow, C. "Advanced formulation techniques including innovative materials" in Cosmetic Formulation: Principles and Practice, edited by Benson, H., Roberts, M., Leite e Silva, V. and Walters, K. and Surber, C., Taylor and Francis Group, 2016. In preparation.

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PRESENTATIONS BY DR. MICHNIAK-KOHN IN 2016

1) Michniak-Kohn, B. Topical and microneedle drug delivery aimed at the hair follicle and deeper dermis. Presented at the Alopecia Areata Research Summit: Building and Crossing the Translational Bridge. NY Academy of Medicine, New York, NY, November 14-15, 2016.

2) Michniak-Kohn, B. Drug-loaded Tyrospheres for dermal delivery. 2016 New Jersey Symposium on Biomateraisl Science: Today's Challenges & Innovations in Biomaterials Science, Marriott Renaissance Woodbridge Hotel, Iselin NJ, October 24-25, 2016.

3) Michniak-Kohn, B. Adapalene-loaded Tyrospheres for the treatment of acne. Innovations in Dermatological Sciences: Delivery of Actives to Skin, Marriott Renaissance Woodbridge Hotel, Iselin NJ, September 29-30, 2016.

4) Michniak-Kohn, B. Polymeric nanospheres for topical delivery of adapalene for acne. Rutgers 250 Pharmaceutical Science Symposium: Celebrating Rutgers 250 Years, September 12-13, 2016.

PUBLISHED ABSTRACTS:

1) Michniak-Kohn, B., Ramezanli, T., Zheng, Z. Polymeric nanospheres for topical delivery of adapalene. Proceedings of 6th International Conference on Clinical and Experimental Dermatology, May 5-7, 2016. Chicago, IL. PODIUM SESSION.

2) Hernandez, E., Pallavi, P., Golshid, K., Wang, Y., Velez, N., Callegari, G., Cuitino, A., Michniak-Kohn, B., Muzzio, F., Romanach, R. Non-destructive prediction of dissolution profiles on tablets with differences in strain using NIR spectroscopy. IFPAC annual meeting, January 24-27, 2016, Arlington, VA.

3) Ramezanli, T. Michniak-Kohn, B. Tyrosine-derived nanospheres: an alternative approach for topical delivery of adapalene. New York Skin Club Conference, Mount Sinai Medical Center, New York, March 31, 2016. ORAL PRESENTATION.

4) Ramezanli T., Zhang Z., Kilfoyle B. and Michniak-Kohn B. Polymeric nanospheres for topical delivery of vitamin D3. 2016, Front. Bioeng. Biotechnol. Conference Abstract: 10th World Biomaterials Congress. doi: 10.3389/conf.FBIOE.2016.01.00586. PODIUM SESSION.

5) Tsai P., Zhang Z., Florek C. and Michniak-Kohn B. Constructing human skin equivalents on porcine acellular peritoneum extracellular matrix for in vitro irritation testing. 2016, Front. Bioeng. Biotechnol. Conference Abstract: 10th World Biomaterials Congress. doi: 10.3389/conf.FBIOE.2016.01.02285.

6) Tang, Q., Ramezanli, T., Michniak-Kohn, B., Vyakarnam, M., Marchant, N. Transform polymer films: Rapid drug delivery hydrogels. 43rd Annual Meeting of Controlled Release Society, Seattle, WA, July 17-20, 2016.

7) Ameen, D., Michniak-Kohn, B. Ex Vivo transdermal permeation of dimethyl fumarate combined with nicotine using human cadaver skin. AAPS Annual Meeting and Exposition, November 13-17, 2016, Denver, Colorado.

8) Martos, N., Michniak-Kohn, B. Effect of insecticide diethyltoluamide (DEET) and co-applied sunscreens on percutaneous absorption of both actives. AAPS Annual Meeting and Exposition, November 13-17, 2016, Denver, Colorado.

9) Ramezanli, T., Michniak-Kohn, B. Tyrosine-derived nanospheres: and alternate approach for acne therapy. AAPS Annual Meeting and Exposition, November 13-17, 2016, Denver, Colorado.

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CDR PARTNERSHIPS

TRI Princeton is an independent, non-profit scientific research and education organization founded in 1930 by an act of US Congress. Over the decades, TRI has evolved into a full-service independent research and testing facility, specializing in porous materials, textiles, fibers, bio-materials, polymers, and films. TRI provides research solutions to a wide variety of domestic and international industrial companies, governmental organizations, and academic institutions.

With the range of instruments and methodologies, characterization goes well beyond just visualization, but deeper into the analysis, identification, and localization of molecular and structural components within the sample. The technical platform encompasses a powerful set of cutting-edge tools and techniques along with complementary approaches for material characterization and analysis, especially well-suited for the study of bio-materials such as hair, skin, nail, bone and/or teeth. These analyses and information can then be correlated to a host of different biophysical parameters. Furthermore, the techniques are exceptional in applications for testing, understanding and comparing variations or changes in biomaterials with relation to specific conditions like aging, diseases, environmental stresses (e.g. UV exposure), chemical exposure, and product treatments (product application or drug therapy). More importantly, changes that occur in these biomaterials and bio-substrates as a function of various factors (whether extrinsic or intrinsic influences) can be established and monitored in specific areas of interest such as at the surface or deep inside the structures of interest.

Contact Info: SGourion@triprinceton.org

Basic and Applied Dermatology Forum (BADF)
The Forum brings speakers with new/challenging topics to the Rutgers community. Now in its 19th year, it succeeds an annual full day multi-speaker conference (1984-1996).

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Otto H. Mills Jr., PhD, F.C.P. Adjunct Professor, Department of Dermatology Rutgers -Robert Wood Johnson Medical School. Otto Mills joined the University of Pennsylvania's Graduate Group on Molecular Biology in 1965 and the Department of Dermatology, School of Medicine in 1967. His first appointment at the University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School was in 1984, where he is a member of the Department of Dermatology. He has lectured by invitation at universities and medical meetings in the United States, Europe and Asia and authored or co-authored over two hundred and fifty publications.

Contact info: Otto H. Mills at Otto@ohmills.com

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From left to right: Norman Richardson, Nigel Langley

From left to right: Nigel Langley, Norman Richardson, Frank Romanski

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- Precision Medicine Technologies and Tools

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