Note: If you are interested in presenting at an upcoming Chapter meeting, please contact any of the SID UMW Chapter Officers for more information. Thank you for supporting your local SID Chapter.

SID Upper Midwest Chapter

PAST MEETINGS

April 5, 2018

Meeting was held on Thursday, April 5, 2018 for a presentation by Professor Bharat Jalan, associate professor in the Department of Chemical Engineering and Materials Science at the University of Minnesota titled "**Novel Synthesis and Characterization of Indium-free Transparent Conductor**".

Meeting Location:

University of Minnesota

Room AMH287 - Amundson Hall

421 Washington Ave. SE

Minneapolis, MN 55455

Scheduled of Events:

5:45 – 6:30 – Social meeting, pizza, cookies and drinks served

6:30 – 7:30 – Presentation/webinar

About the presentation:

Abstract:

Electronic display requires materials possessing both high electrical conductivity and high optical transparency. Current material standard is based on indium tin oxide (ITO), which is expensive owing to the use of indium. Much work has been done in an attempt to replacing ITO

with a material that is more efficient in addition to be cheaper. $BaSnO_3$ with a perovskite structure (ABO_3, where A and B are elemental cations) can nicely fit these requirements. There are, however, many challenges for synthesis of $BaSnO_3$ in thin film form. In this presentation, I will review these challenges, and our group's effort to address these challenges. I will present our recent development of novel thin film approach method, allowing for the synthesis of high quality $BaSnO_3$ films with conductivity exceeding 104 S/cm and optical transparency of >90%. I will also discuss factors limiting the electronic conductivity and transparency in these materials and ways to eliminate them [1].

[1] A. Prakash, P. Xu, A. Faghaninia, S. Shukla, J. W. Ager III, C. S. Lo, and B. Jalan, "Wide Bandgap $BaSnO_3$ Films with Room Temperature Conductivity Exceeding 104 Scm-1" Nat. Comm. 8, 15167 (2017)

About the speaker:

Bharat Jalan is an associate professor in the Department of Chemical Engineering and Materials Science at the University of Minnesota, where he leads the Thin Films and Heterostructure Synthesis Group. His interests are in study of structure-defect-electronic properties relationships of functional oxide films and artificially designed structures. In 2016, he received the biennial International MBE Young Investigator Award and the AFOSR Young investigator award. More recently in 2017, he was awarded with the American Association for Crystal Growth Young Author Award and the AVS Paul Holloway Young Investigator Award. He was named an Emerging Young Investigator by the Royal Society of Chemistry (J. Mater. Chem. C, 2017). Jalan has (co)-authored more than 39 peer-reviewed publications and given more than 45 invited talks and colloquiums. He is a member of the APS, MRS, AVS, and ACerS, and has (co)-organized multiple symposia for these societies including multiple international meetings on the physics and chemistry of oxide thin films and heterostructures. He serves as an editorial board member of the Nature Scientific Reports journal. He had served as an invited member of the MRS task force for the strategic planning for the National Nanotechnology Initiative submitted to the White House (NNI – 2010).

Jalan received a BS degree in MSE from Indian Institute of Technology (IIT) Madras in India (2006) and a PhD degree in Materials Science from the University of California, Santa Barbara (2011). From 2011-2016, he was an assistant professor at the University of Minnesota, Twin Cities and was recently promoted to the associate professor.

March 6, 2018

MinnTS (Minnesota Technical Symposium) 2018

Topic(s): Artificial Intelligence (AI) in Autonomous Driving by Matthew Linder, Autonomous Solutions Researcher at VSI

Autonomous Bus Technology by Jay Hietpas, Director, MnDOT Office of Traffic, Safety and Technology

Location: Schuman Research Facility, 655 Lone Oak Drive, Eagan, MN 55121

Time: Tours of the Ecolab facility will begin at 4:30-5:00 PM, with social hour between 5-6 PM, dinner and talks from 6-9 PM.

For details and latest information, please check the MinnTS web (www.minnts.org).

October 19, 2017

On **Thursday, October 19th, 2017,** Dr. Zhisheng Yun of 3M presented on the topic of **Virtual Reality (VR) and Augmented Reality (AR) Technologies for Head Mounted Displays**.

Meeting Location:

U.S. Electronics, Inc.

900 Colorado Ave. S.

Minneapolis, MN 55416

About the presentation:

Abstract:

This presentation reviewed the technology developments in Head Mounted Display including Virtual Reality (VR) and Augmented Reality (AR) technologies. Market research and forecasts in Head Mounted Displays of AR and VR were provided, followed by a review of the hardware development history, especially in optical technology development to achieve the near-eye display. Further, a few leading optical technologies in the current VR and AR industry were explored and some technologies that 3M has developed to enhance the Head Mounted display in AR and VR will be unveiled.

About the speaker:

Dr. Zhisheng Yun graduated from Xi'an Institute of Optics and Precision Mechanics with a PhD in optics in 1998 and a MSc in optical engineering from The Institute of Optics and Electronics, Chinese Academy of Sciences.

Prior to starting his career in the U.S., Dr. Yun was hired as an assistant professor in Xi'an Technological University in 1988. He moved to USA in 2001 and worked at Phosistor Technologies, Jabil Circuit, and Thermawave (now KLA-Tencor) with various engineering positions with increasing responsibility in research and development.

Dr. Yun began his 3M career in 2007 as an Optical Design Specialist, a Senior Optical Specialist and then a Senior Product Development Specialist. His career has progressed through inventing and developing many 3M iconic products like 3M Mobile Projectors, 3D Dental True Definition Scanner, UV curing lights, 3M projection systems, 3M PBS, 3M folded optical lens, etc.

Dr. Yun has 15 granted and 35 filed patents. He has published 40 papers in prestigious scientific Journals and International conferences. Dr Yun's work has been widely reported in popular media including Star Tribune (3M waves a magic Wand, pp D4, Aug 10, 2014 and Big things from 3M in miniature projection, Jan 11, 2009); EllenTV show (3M Shoot n Share, Nov 3, 2010); scientific magazines such as, Photonics Spectra (Profiling Aspherical Surface, Dan

Drollette, Nov 1999, pp28); Popular Science, won the “Grand Award” for the “best New Gadgets” in 2008 etc. Dr. Yun received the Silver Edison award in 2015 and was recognized as a key contributor for the Gold Edison award in 2010 for 3M Mobile Projection Technology. He is a multiple recipient of 3M’s Circle of Technical Excellence & Innovation award given in 2009, 2010 and 2013.

Dr. Yun is a senior member of IEEE, a member of SID, SPIE, OSA and AADR/IADR.

March 16, 2017

MinnTS (Minnesota Technical Symposium) 2017

Topic: Virtual and Augmented Reality; Speakers, Michael Nowak and Mehdi Mekni

Location: Schuman Research Facility, 655 Lone Oak Drive, Eagan, MN 55121

Time: Tours of the Ecolab facility will begin at 4 PM and 5 PM, with social hour beginning at 5 PM, dinner from 6-7 and talks from 7-9.

For details and latest information, please check the MinnTS web (www.minnts.org).

January 12, 2017

On **Thursday, January 12th, 2017,** Mr. Richard Pokorny of 3M gave a presentation on the topic of **Super Durable Cover Lens Film**. Dinner and social gathering was provided before the meeting with the presentation following.

Schedule of Events:
6:00 – 6:45 – Dinner Served; Social meeting

6:45 – 7:30 – Presentation

Meeting Location:

U.S. Electronics, Inc.
6250 Wayzata Blvd.
Minneapolis, MN 55426

About the presentation:

Abstract:
A new, hard coated cover lens film for the display industry is described. Interference fringing is drastically reduced through the use of a novel primer. The mechanism of failure in abrasion and scratch testing is explained along with the implications of this for designing a robust cover lens film.

As the display industry moves towards flexible displays, glass is no longer very useful as a cover for the front surface of the display. The challenge is to develop a plastic film with very good flexibility and similar protection (scratch and abrasion) to glass. 3M has developed very abrasion resistant, highly durable optical coatings for the front surface of displays. In this talk, the mechanism of abrasion will be described as well as abrasion and scratch test methods. Finally, we will discuss some of the additional functionality that can be incorporated into front surface films.

About the speaker:
Richard Pokorny- He is a staff scientist at 3M. He has worked at 3M for the last 40 years in a variety of positions. He has over 60 patents. Since 1994, he has been developing coatings for optical films used in the display industry. 3M sells BEF and DBEF brightness enhancement films as well as front surface films like privacy films and screen protector films. All of these films require coatings for protection as well as for additional functionality. Examples of these functionalities include: scratch and abrasion resistance, anti-static, matte (diffuse), anti-lint and even fingerprint fading.

November 2, 2016

On **Wednesday, November 2nd, 2016** Speakers, Robert F. Dunhouse, Jr. and Dan G. Gutierrez, gave a presentation titled, ***Displays - AMOLED & PCAP Generation 2 Technical Overview***.

Dinner and social gathering was provided before the meeting with the presentation following.

Schedule of events:

6:00 – 6:45 – Dinner Served; Social meeting

6:45 – 7:30 – Presentation

Meeting Location:

PARK PLACE WEST (Across from the Offices of HIGH TECH SALES)

6465 Wayzata Blvd. #100

St. Louis Park, MN 55426

About the presentation:

Besides AM-TFT displays and PCAP products, Tianma also supports AMOLED. Tianma AM-OLED is a joint venture by Shanghai Industrial Investment (group) Co., LTD., Shanghai Zhangjiang (group) Co., LTD., and Shanghai Tianma Microelectronics Co., LTD., founded in Pudong district of Shanghai, with registered capital of USD$150 million and the total investment of USD$230 million, and it covers about 120 thousand square meters. It has a Gen5.5 AM-OLED production line, positioned for small-to-medium-sized display market, and the products mainly used in Mobile Devices, Wearable, etc. Tianma will be presenting a technical outline of AMOLED including flexible structures, wearable items and further future developments. Demonstration of a flexible AMOLED and PCAP displays will be viewed.

Brief overview on Tianma's PCAP Gen2 approach. Wet & Glove PCAP models are able to be operated even when the screen is wet and the operator is wearing gloves. Furthermore, by tuning the controller, the touch screen can be operated when the operator is using various medical gels on the surface of the screen, or when the operator is wearing thicker, industrial gloves. With this technology, PCAP touch panels are available to support high end display devices used in special conditions such as construction, marine or medical equipment.

About the speaker(s):

Robert F. Dunhouse, Jr. comes with over 30 years' experience in the electronics industry. His background started with his work in Research & development at Cincinnati Microwave (founders of ESCORT radar detectors). He also opened a branch office in Sydney Australia for the company. He founded US design and manufacturing company – Creative Circuits. Today Bob is Sr. Manager, Engineering at Tianma NLT USA, previously NEC Electronics America. He has been at TNU for the last 20 years involved in the company's Active Matrix TFT display offerings supporting the industrial markets for those products. Bob not only serves TNU as top technical spokesperson but he also has served as the company's liaison in communicating the North American display market needs to his factories in Asia. Bob enjoys not only technology but also the love for cars. Owner of an original '91 NSX one of his favorite cars is the Pagani Huayra.

Dan G. Gutierrez is a display engineer who has worked at three of the top display manufacturers from Japan and China. He has over 25 years display experience with 19 of those now Tianma NLT USA, previously NEC Electronics America. He has been involved primarily in the support of industrial displays including factory automation, medical, transportation, avionics, marine and many other non-consumer applications. He has not missed an SID Display Week in the last 20 years. In addition to numerous technical applications, he also has a great love for technology in general. His first BYOPC project was an old 8086 PC XT system.

July 28, 2016

On **Thursday, July 28th**, Speakers, Brad Flaherty and Jemiah Aitch, gave a presentation titled, ***Displays - Piezo Inkjet Heads, Wide Format Printing, and Video Content***.

Dinner was provided before the meeting and a tour of Sign Zone Inc.'s facility with prototype demonstrations followed the presentation.

Schedule of events:

6:00 – 6:45 – Dinner Served; Social meeting
6:45 – 7:30 – Presentation
7:30 – 8:15 – Facility tour and prototype demonstrations

Meeting Location: Sign Zone - 6850 Shingle Creek Parkway, Brooklyn Center MN 55416

About the presentation:
Sign Zone Inc. has seen the integration of video content into a few of the distribution channels they serve. Sign Zone joined SID to try and scope the various technologies available for Video Content delivery (Projection, E-paper, LCD, OLED). Brad will be presenting his views on Piezo inkjet heads. He will also speak about the intersection between the world of "Electronic Displays" and "Promotional Printed Displays" and what the future may hold for electronic displays in the promotional display industry. Demonstrations of a few prototypes in progress will be given. Comments (and criticisms) are welcome, and we hope the event is more of a dialogue than a lecture.

About the speaker(s):
Brad Flaherty began his working career, in the family business, selling silk-screened signage. He built a new territory for this business in Wisconsin. When the recession hit it, all went south. Brad left the family business for two years (working in promotional advertising and polyethylene printing). Now he works at Sign Zone Inc. as a product developer and new technology researcher. Brad is a generalist. He has investigated AR, 3Dprinting, collaborative robotics and a number of other technologies for Sign-Zone Inc. He appreciates SID because the members usually have a deeper knowledge of many technologies than he does.

Jemiah Aitch is an embedded systems engineer who has worked at PD Logic and Digi international. He now works with Sign Zone Inc. He has worked on technology projects in the healthcare, pharmaceuticals, defense, and semiconductor industries. In addition to the deeply technical applications he has worked on, he also has a great love for technology in general. He has completed personal projects that use technology for kinetic sculpture, as well as performance art.

April 12, 2016

Dr. John Van Derlofske gave a presentation on April 12th titled, Achieving Rec 2020: How Close is Close Enough. Please send James Lupino your reservation by Friday, April 8. This presentation will be interesting and timely as wide color gamut and high dynamic range cameras, media, and displays enter our lives and change how we perceive image quality.

Start Time: 6:00 PM

Location: US ELECTRONICS
6250 Wayzata Blvd.
MINNEAPOLIS, MN 55416

Achieving Rec 2020: How Close is Close Enough

One constraint on a complete transition to the International Telecommunication Union's (ITU) BT.2020 broadcasting standard (Rec. 2020) is the limited availability of displays that achieve the recommended color space. However, several technologies are capable of coming close. 3M's research addresses the question of how close the primaries must be to the standard to be acceptable for different applications (e.g. professional vs. consumer). In previous research, 3M measured color difference detection thresholds for colors along the Rec. 2020 boundary with simple test patterns. In our current study, we measured color discrimination rates for photographic images rendered in color spaces near Rec. 2020 in two tasks: (1) images viewed sequentially and (2) images viewed side-by-side. We discuss how to use these data to define tolerance criteria for different applications and examine if prototype quantum-dot enabled LCDs meet these criteria.

Speaker Bio: Dr. John Van Derlofske

John Van Derlofske received his Ph.D. in physics from the University of Alabama in Huntsville where he concentrated on illumination systems design. After graduation, he worked as head optical designer for Chrysler, developing automotive lighting and illumination systems. Van Derlofske spent the next eight years at Rensselaer Polytechnic Institute heading the Transportation Lighting Group at the Lighting Research Center. Currently, Van Derlofske is a senior research specialist at 3M where he works on the design, manufacturing and application of light control films that make LCD systems brighter, more colorful and more efficient. His current focus is on improving LCD color by integrating quantum dot technology.