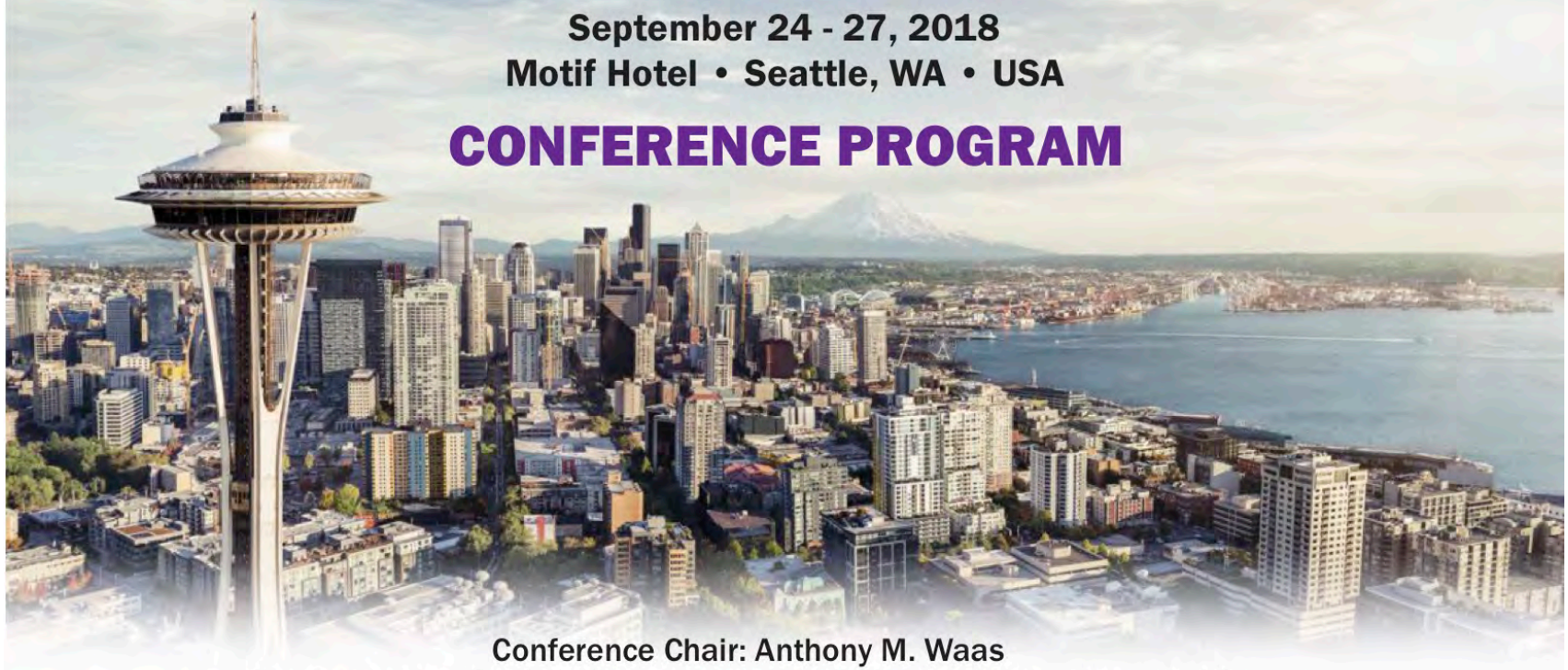
AMERICAN SOCIETY FOR COMPOSITES
33rd TECHNICAL CONFERENCE

September 24 - 27, 2018
Motif Hotel • Seattle, WA • USA

CONFERENCE PROGRAM



Conference Chair: Anthony M. Waas
Conference Co-Chairs: Giovanni Greco, Mostafa Rassaian, Mark Tuttle

日本複合材料学会
Japan Society for Composite Materials

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Based in the city of Sendai within the Tohoku region of northern Honshu, Tohoku University is one of the top research and teaching universities in Japan. The University of Washington and Tohoku University are partnering on an Academic Open Space to foster collaborations and academic exchanges between these two leading research institutions of the Pacific Rim. The agreement is expected to build upon current collaborations in aerospace design and materials, as well as launch new science and engineering partnerships.

Silver Sponsors

Founded in 1970, ANSYS employs nearly 3,000 professionals and is the global leader in engineering simulation software. We work with over 45,000 customers including 96 of the top 100 industrial companies on the Fortune 500 list. These customers are designing new rockets for space exploration, autonomous vehicles, advanced implantable medical devices and patient-specific treatment procedures, supersonic trains, more efficient wind turbines and solar energy solutions, ever-smaller electronics for smartphones and computers, and embedded software for devices comprising the Internet of Things - to name only a few applications. Additionally, we work with thousands of universities and are committed to helping all engineers enter the workforce with an understanding of how to make an impact using simulation. We offer three different free student downloads available on our website at ansys.com/studentwww.ansys.com/student. We also have an online Student Community that allows users to find answers to questions, pose their own questions and interact with other users. We also partner with universities and professors for research projects and curriculum development.

Convergent Manufacturing Technologies, Inc (Vancouver, BC) and its US based partner Convergent Manufacturing Technologies US Inc (Seattle, WA) are industry leaders in digital manufacturing solutions for composites. From pre-manufacturing composites process simulation and materials characterization to process monitoring, Convergent's products and services help make composites manufacturing more efficient and lower risk at every stage. Convergent's flagship composite process simulation software, COMPRO, came out of research done in the Composites Group at The University of British Columbia over 20 years ago. Since then, Convergent has added RAVEN, LIMS, and CPA-TA to develop a software suite that makes robust composite simulation accessible for a wide variety of end users. Along with our strong connections to industry, Convergent has established close ties to universities and research centers worldwide with the aim to bring the latest advancements in academia to engineering practice.

ESI Group is a leading innovator in Virtual Prototyping software and services. Specialist in material physics, ESI has developed a unique proficiency in helping industrial manufacturers replace physical prototypes by virtual prototypes, allowing them to virtually manufacture, assemble, test and pre-certify their future products. Coupled with the latest technologies, Virtual Prototyping is now anchored in the wider concept of the Product Performance Lifecycle™, which addresses the operational performance of a product during its entire lifecycle, from launch to disposal. ESI's simulation software helps you target defects early in your composite product's development cycle, when it's easier to fine-tune the manufacturing process, allowing you to analyze and optimize individual manufacturing operations. PAM-COMPOSITES addresses a wide range of composite materials, with a focus on continuous fibers. It can model carbon or glass fibers, thermoset or thermoplastic matrix, dry textiles or pre-pregs.

Janicki Industries is a privately owned Engineering and Manufacturing company, specializing in advance composite materials and exotic metals, with large-scale facilities and high precision equipment that produces parts and tools for a myriad of industries. Janicki Industries designs and builds high-precision parts and tooling for aerospace, marine, energy, space, military, transportation and architecture customers. We specialize in composite materials and exotic metals. Our R&D lab continuously pushes the boundaries of composite fabrication materials and techniques. Customer-needs drive this process. Our proprietary 5-axis CNC machines are unrivaled in scale and precision, with machining envelopes up to 100 feet in length. A full-service engineering company, we specialize in large complex projects with demanding timelines. Using SAP enterprise project management software, we provide customers real-time information regarding project resources, timelines and costs.

Toray Composites (America), Inc. and Toray Carbon Fibers America, Inc. merged to form Toray Composite Materials America. Both original companies have worked successfully together for 20 years and share the same philosophy and culture. Both companies are accomplished with an enviable track record of providing industry leading solutions for our clients. We believe our successes are a result of our industry leading practices and the knowledge, passion, and total commitment to quality from all our employees.

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Conference Organizing Committee

Conference Chair: Prof. Anthony M. Waas, Boeing Egtvedt Chair,
Department of Aeronautics and Astronautics, University of Washington, Seattle, WA 98195-2400
(effective Sept 1, 2018 – Richard A. Auhll Department Chair, Aerospace Engineering, University of Michigan, Ann Arbor, MI 48109)

Conference Co-Chairs:
Prof. Mark Tuttle, University of Washington, Seattle
Dr. Mostafa Rassaian, The Boeing Company
Dr. Jun Koyanagi, Japan Society of Composite Materials
Dr. Adam Sawicki, The Boeing Company

Local (UW) Organizing Committee: Marco Salviato, JK Yang, Dwayne Arola, Fumio Ohuchi and Debra Bryant

The conference program content was developed with the much-appreciated efforts of the Track Organizers:

Track Letter	Track Name	Organizers
A1	Adhesive Joints	S. Stapleton and L. Deobald
A3	Automotive Composites	Liangkai Ma
B1	Bio-based Composites	K.T. Tan
B3	Buckling and Post-Buckling of Composite Structure	A. Waas and P. Davidson
C2	Composites in Extreme Environments	P. Prabhakar
C3	Crashworthiness	V. Aitharaju
E1	Effects of Defects	P. Davidson, A. Bergan and M. Maiaru
E2	Environmental Effects	L. Grace
F1	Fatigue of Composites	M. Salviato and P. Davidson
I1	ICME of Composites	S. Arnold, M. Maiaru and D. Zhang
I2	Impact Dynamic Response	K.T. Tan and H. Kim
M1	Micromechanics	E. Pineda, S. Arnold and B. Bednarcyk
M2	Model-based Design for Manufacturing	A. Blom and M. Rassaian
M3	Molecular Modeling of Nanomaterials and Nanocomposites	S. Chowdhury, A. Ashfaq, M. Salviato and V. Unnikrishnan
M4	Multifunctional Composites	J.K. Yang
N1	Nanostructured Composites	S. Roy
N2	NASA ACC Predictive Capabilities for Impact, PDA and AFP	S. Wanthal and C. Rose
N3	Next Generation Composites: Constituents and Microstructures	D. Arola and F. Ohuchi
N4	Non-Traditional Laminate Applications in AFP Rate Optimization	A. Blom and M. Rassaian
O1	ONR-Sponsored Session	W. Nickerson and H. Kim
P1	Processing & Manufacturing	A. Horner and D. Zhang
P2	Progressive Damage and Failure Analysis of Composites	E. Pineda and B. Bednarcyk
S1	Sandwich Composites	J. Simon, B. Bednarcyk, E. Pineda and D. Hoewer
S2	Solvay Student Competition	V. Ranatunga and M. Pankow
S3	Special Session Honoring Dr. T Kevin O'Brien	V. Ranatunga and M. Pankow
S4	Stochastic Modeling and Analysis of Composites	S. Sanei and S. Stapleton
S5	Structural Health Monitering of Composite Structures	S. Mulani, N. Takeda and T. Okabe
	Student Poster	M. Salviato
T1	Test and Characterization Methods	V. Ranatunga and M. Pankow
T2	Textile Composites	M. Pankow

Conference Information

Registration Desk: Please check in and pick up your badge and conference materials at the registration desk located in the fourth floor foyer. Staff will be available throughout the conference to provide general information and to assist conference participants.

Name Badges: Please wear your conference name badge at all times. It is your ticket to sessions, lunches, and breaks.

Meals: Continental breakfast will be available on Monday, Tuesday, and Wednesday mornings, in the Emerald Ballroom. Daily lunch will be held in the Emerald Ballroom. Your name badge is your lunch ticket. If you had a special dietary request, a ticket was included in your registration materials detailing your request. Please place the ticket on your plate at lunch to alert your server to your special meal request.

Welcome Reception: Monday evening, third floor Emerald Foyer, 6:00-7:30 pm
Please join us for appetizers, beverages and an enjoyable evening to network with your friends and colleagues.

ASC 2018 Awards Banquet: Tuesday evening, third floor Emerald Ballroom. 6:00-8:00 p.m. Banquet tickets were included with your registration materials. If you purchased a guest banquet ticket, that ticket was also included.

Tech Division Meetings: Tuesday, 5:15-6:00 p.m. Tech Division Meeting Rooms will be Belltown, Pioneer, Capitol Hill and the First Hill.

Internet: For WiFi internet access, you have two options.
First option:
Connect to Motif_Meetings network. Automatic connection with no password.
Second option:
Connect to Motif_Sec and enter Seattle2018 at the prompt.

Presenter Info: Most presentation slots are 25 minutes, allowing 20 minutes for presentations and five minutes for questions & answers plus changing speakers. Please have your presentation file on a USB drive and copy it to the room's computer during one of the breaks before your presentation starts. Please ensure that the presentation file name includes your last name. Also, before your session starts, please introduce yourself to the session chair in the presentation room.

Audio/Visual Equipment: Each room will have a LCD projector, VGA video cable, projection screen, PC-based computer, laser pointer and microphone.

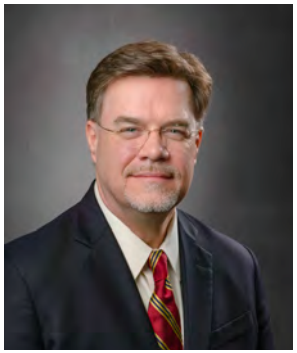
Session Chair Info: Session chairs should arrive at the session room 10 minutes before the session start time. Chairs should strictly enforce and follow the published conference schedule. Please keep the introductions brief.

Thursday Tours: We regret that both the Boeing Tour and Blue Origin tours are full and have waiting lists. If you were confirmed for one of these tours, you were notified and your name is included on our tour list.

Program Overview

Room	MONDAY 9/24	TUESDAY 9/25	WEDNESDAY 9/26
Emerald Foyer	7:30-8:00am Continental Breakfast	7:30-8:00am Continental Breakfast	7:15-7:45am Continental Breakfast
Emerald	8:00-8:50am OPENING PLENARY: G. Hyslop	8:00-8:50am PLENARY: N. Takeda	7:45-8:35am STINCHCOMB MEMORIAL LECTURE: D. Adams
	9:00-10:15am PARALLEL SESSIONS 1	9:00-10:15am PARALLEL SESSIONS 5	8:45-10:00am PARALLEL SESSIONS 9
Seattle 1	Impact Dynamic Response 1	Impact Dynamic Response 5	ONR-Sponsored Session 3
Seattle 2	Processing & Manufacturing 1	Processing & Manufacturing 5	Effects of Defects 3
Seattle 3	Progressive Damage and Failure Analysis of Composites 1	NASA ACC Predictive Capabilities for Impact, PDA and AFP 1	Adhesive Joints 1
Belltown	ICME of Composites 1	Micromechanics 1	Special Session Honoring Dr. T Kevin O'Brien 2
Pioneer	Test and Characterization Methods 1	Model-based Design for Manufacturing 2	NASA ACC Predictive Capabilities for Impact, PDA and AFP 4
Capitol Hill	Molecular Modeling of Nanomaterials and Nanocomposites 1	Non-Traditional Laminate Applications in AFP Rate Optimization 1	Stochastic Modeling and Analysis of Composites 3
First Hill	Next Generation Composites: Constituents and Microstructures 1	Nanostructured Composites 1	Textile Composites 1
Blue Mouse			ASTM Committee D30.04 Lamina and Laminate Test Methods
	10:15-10:30am Networking Break	10:15-10:30am Networking Break	10:00-10:10am Networking Break
	10:30am-12:10pm PARALLEL SESSIONS 2	10:30am-12:10pm PARALLEL SESSIONS 6	10:10am-11:50pm PARALLEL SESSIONS 10
Seattle 1	Impact Dynamic Response 2	Impact Dynamic Response 6	ONR-Sponsored Session 4
Seattle 2	Processing & Manufacturing 2	Processing & Manufacturing 6	Sandwich Composites 1
Seattle 3	Progressive Damage and Failure Analysis of Composites 2	Test and Characterization Methods 5	Adhesive Joints 2
Belltown	ICME of Composites 2	Micromechanics 2	Automotive Composites 1
Pioneer	Test and Characterization Methods 2	Special Session Honoring Dr. T Kevin O'Brien 1	Multifunctional Composites 1
Capitol Hill	Molecular Modeling of Nanomaterials and Nanocomposites 2	Non-Traditional Laminate Applications in AFP Rate Optimization 2	Stochastic Modeling and Analysis of Composites 4
First Hill	Solvay Student Competition	Nanostructured Composites 2	Textile Composites 2
Blue Mouse			ASTM Committee D30.06 Interlaminar Properties
Emerald	12:10-1:30pm LUNCH WITH SPEAKER: K. Shahwan	12:10-1:30pm LUNCH WITH SPEAKER: A. Poursartip	11:50am-1:00pm LUNCH WITH SPEAKER: P. Weaver
	1:30-3:10pm PARALLEL SESSIONS 3	1:30-3:10pm PARALLEL SESSIONS 7	1:15-2:55pm PARALLEL SESSIONS 11
Seattle 1	Impact Dynamic Response 3	ONR-Sponsored Session 1	ONR-Sponsored Session 5
Seattle 2	Next Generation Composites: Constituents and Microstructures 2	Effects of Defects 1	Sandwich Composites 2
Seattle 3	Progressive Damage and Failure Analysis of Composites 3	Test and Characterization Methods 6	Environmental Effects
Belltown	ICME of Composites 3	Micromechanics 3	Automotive Composites 2
Pioneer	Test and Characterization Methods 3	NASA ACC Predictive Capabilities for Impact, PDA and AFP 2	Multifunctional Composites 2
Capitol Hill	Molecular Modeling of Nanomaterials and Nanocomposites 3	Stochastic Modeling and Analysis of Composites 1	Stochastic Modeling and Analysis of Composites 5
First Hill	Fatigue of Composites 1	Nanostructured Composites 3	Structural Health Monitering of Composite Structures 1
Emerald 3			Posters + 10 Min Presentations
Blue Mouse			ASTM Committee D30.03 Constituent/Precursor Properties/D30.09 Sandwich Construction
	3:10-3:25pm Coffee Break	3:10-3:25pm Coffee Break	2:55-3:10pm Networking Break
	3:25-5:05pm PARALLEL SESSIONS 4	3:25-5:05pm PARALLEL SESSIONS 8	3:10-4:50pm PARALLEL SESSIONS 12
Seattle 1	Impact Dynamic Response 4	ONR-Sponsored Session 2	Composites in Extreme Environments
Seattle 2	Processing & Manufacturing 4	Effects of Defects 2	Buckling and Post-Buckling of Composite Structure
Seattle 3	Progressive Damage and Failure Analysis of Composites 4	Next Generation Composites: Constituents and Microstructures 3	Micromechanics 4
Belltown	ICME of Composites 4	Crashworthiness	Automotive Composites 3
Pioneer	Test and Characterization Methods 4	NASA ACC Predictive Capabilities for Impact, PDA and AFP 3	Multifunctional Composites 3
Capitol Hill	Model-based Design for Manufacturing 1	Stochastic Modeling and Analysis of Composites 2	Bio-based Composites
First Hill	Fatigue of Composites 2	Nanostructured Composites 4	Structural Health Monitering of Composite Structures 2
Emerald 3			Posters + 10 Min Presentations
Blue Mouse			ASTM Committee D30.10 Composites for Civil Structures
	5:05-5:10pm Break	5:05-5:10pm Break	**THURSDAY 9/27**
	5:15-6:00pm *Emerald Ballroom* GENERAL SESSION	5:15-6:00pm Tech Division Meetings	8:00am-12:30pm Belltown ASTM Committee D30
	6:00-7:30 pm *Emerald Foyer & Ballroom* WELCOME RECEPTION	5:15 pm NO-HOST SOCIAL *Emerald Foyer* 6:00-8:00pm AWARDS BANQUET Speaker: S. Chisholm, Boeing *Emerald Ballroom*	Optional Tours

Monday Speakers



Plenary

Greg Hyslop

Aerospace And Composites: Together, We Change The World

Dr. Greg Hyslop is the chief technology officer of The Boeing Company and its senior vice president of Engineering, Test & Technology. Hyslop oversees the development and implementation of the company's enterprisewide technology investment strategy, and his portfolio of responsibilities includes the companywide Boeing Engineering function and its 45,000 teammates; Boeing Research & Technology, the company's advanced central research and development organization; Boeing Test & Evaluation, the team that verifies and validates Boeing's commercial and defense products; and the Intellectual Property Management organization, which works to protect and strategically leverage the company's intellectual property. Hyslop has held numerous leadership positions in his 36-year Boeing career. Among the organizations he's overseen are Boeing Research & Technology, Boeing's Strategic Missile & Defense Systems business, and the company's Ground-based Midcourse Defense program. He joined McDonnell Douglas, now part of Boeing, in 1982 as a guidance and control engineer. Hyslop is a member of the Aeronautics Committee of the NASA Advisory Council. He has also been named an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA) and is a member of the Board of Trustees of the AIAA Foundation. He serves on the Advisory Board of the University of Nebraska's Engineering College, the Engineering Advisory Council of the University of Notre Dame's College of Engineering, and the Board of Trustees of the Museum of Science and Industry, Chicago. Hyslop has a Bachelor of Science degree in electrical engineering and a Master of Science degree in mathematics from the University of Nebraska. He also has a Doctor of Science degree in systems science and mathematics from Washington University in St. Louis, where he served as an adjunct professor.

Luncheon Keynote

Khaled Shahwan

Automotive Composites – 30 Years of Challenges, Collaborations, Innovations and Advanced Developments

Dr. Khaled Shahwan has been with Fiat Chrysler Automobiles (FCA) since 1999 and is currently the Technology Lead – Composites, Methods & Strategies, Global Innovation & Advanced Development Engineering. Khaled served as the 2014 and 2017 Chairman of US-DOE's USDRIVE-MTT, and Chairman-Board of Directors of the Automotive Composites Consortium. Prior to joining FCA Dr. Shahwan worked at Ford's Scientific Labs. Dr. Shahwan has been the auto industry's lead on technology and strategy roadmaps by USDRIVE/MTT, IACMI, NIST/CAIIAC, ACC/Plastics, DOE/VTO, & NHTSA. Khaled is a member of the Technical Advisory Boards of IACMI, CAR, Aero Depts. at Univ. of Washington and Univ. of Michigan. Dr. Shahwan is a member of the Editorial Boards of IJVS, IJVD, IJAutoC and JEM '04-'14, and is an elected Associate Fellow of AIAA. Dr. Shahwan has 40 publications, and 60 industry-government collaboration reports. Dr. Shahwan holds a PhD and MS in Aerospace Engineering, and MS in Civil/Structural Engineering, all from the University of Michigan.

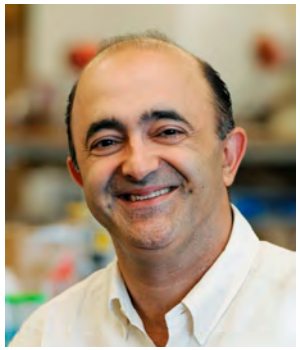
Tuesday Speakers

Plenary

Nobuo Takeda

Integrated In-Process Monitoring of High-Rate Production CFRP Structures for Material Quality Assurance

Professor Nobuo Takeda, is currently Technical Adviser to Director, Aeronautical Directorate, JAXA (Japan Aerospace Exploration Agency) He is Professor Emeritus, the University of Tokyo and President of RIMCOF (Research Institute of Metals and Composites for Future Industries). His research includes experimental micromechanics of composites and smart composite structural health monitoring (SHM) and life cycle monitoring (LCM). He has led several Japanese national projects on structural health and process monitoring of aerospace composite structures mainly based on optical fiber sensors. He has just finished his term as President of International Committee of Composite Materials (ICCM) and Japanese Representative of International Committee on Aeronautical Fatigue (ICAF). He is also Asian Editor of Composites Part A. He published more than 320 refereed journal papers and 40 review articles, and delivered 60 Plenary/Keynote talks.

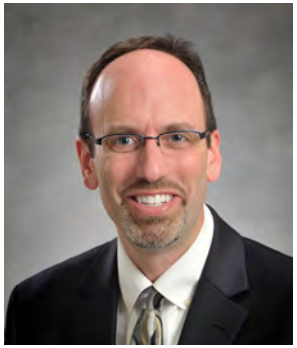


Luncheon Keynote

Anoush Poursartip

Digital Manufacturing of Composites: Past, Present, and Future

Dr. Anoush Poursartip (Ph.D, P.Eng., FCAE) is Director of the Composites Research Network, Co-Director of the Digital Learning Factory Initiative, Professor in the Department of Materials Engineering at the University of British Columbia, and Director of Research at Convergent Manufacturing Technologies. Poursartip has worked on the simulation of manufacturing and failure of composite materials and structures for over thirty years. Based on the successful transition of manufacturing simulation to the aerospace industry via Convergent Manufacturing Technologies, he and his colleagues created the Composites Research Network at UBC, which aims to bridge the gap between academic research and industrial practice by professionalizing the systematic practice of knowledge, including simulation, to make better manufacturing decisions. Poursartip has won two Outstanding Performance Awards and the Bronze Merit Award from The Boeing Company; is a recipient of the Medal of Excellence in Composites and the ASTM Wayne Stinchcomb Award; and is a Fellow of the Canadian Academy of Engineering, ICCM, and SAMPE.



Banquet Keynote

Steve Chisholm

Smarter Testing

Steve Chisholm is the Boeing Commercial Airplanes (BCA) Vice President and Senior Chief of Structures Engineering. In this capacity, he sets the Structures technical direction and technology readiness for BCA, ensuring overall structural integrity of Boeing's products and services. Before this assignment, Chisholm was the Director of Structures Engineering for BCA, leading BCA Airplane Structures in support of Airplane Development, Airplane Programs, Product Development and Commercial Aviation Services. As Director, he was responsible for driving functional excellence for all Structures Design and Stress skills. He has been deeply involved in technical issues at Boeing, and was a member of the Boeing Technical Fellowship before entering management. A strong supporter of airplane safety, he has long been involved in safety and compliance issues, was an Authorized Representative for the FAA, and has been an active member of several airplane accident investigations. Chisholm joined Boeing in 1986 as a structural stress analyst on the 747 and 767 programs. He holds a Bachelor of Science in mechanical engineering from the University of Washington and a Masters in Business Administration from Seattle University.

Wednesday Speakers

Plenary

Daniel O. Adams

Wayne W. Stinchcomb Memorial Award Lecture

Crashworthiness: The Next Frontier in Composite Mechanics

Dr. Daniel O. Adams is a Professor of Mechanical Engineering at the University of Utah and Vice President of Wyoming Test Fixtures Inc. in Salt Lake City, UT. He obtained a B.S. in Mechanical Engineering from the University of Wyoming, and an M.S. and Ph.D. in Engineering Mechanics from Virginia Tech. Dr. Adams has a combined 38 years of academic/industry experience in the composite materials field. He is vice-chair of ASTM Committee D30 on Composite Materials and co-chair of the Testing Committee for the Composite Materials Handbook (CMH-17). He is the recipient of the Virginia Tech College of Engineering Outstanding Young Alumni Award in 1999, and the University of Utah Distinguished Teaching Award in 2007. Dr. Adams' research focuses on the mechanics of composite materials and structures, including test method development, composite damage assessment, and crashworthiness.

Luncheon Keynote

Paul Weaver

Design, Manufacture and Testing of an In-Situ Consolidated, Out-of- Autoclave, Blended, Integrated-Stiffener, Variable Stiffness, Thermoplastic Composite Wingbox

Paul Weaver has held the position of Bernal Chair of Composite Materials and their Structures at the University of Limerick since 2016 and has been Professor of Lightweight Structures at the University of Bristol since 2009. Paul's expertise lies in developing new design concepts and methods with lightweight composite structures. He has worked closely with Airbus, Leonardo Helicopters, Vestas Wind Systems and has been a consultant to NASA for 12 years and has been a principal or co-principal investigator of grants totalling >50MEuro. He holds an Science Foundaton Ireland (SFI) Research Professorship (€6.4M) entitled Varicomp which brings together his interests in both shape changing and lightweight composite structures. He currently holds a Royal Society Wolfson Merit award and was previously an EPSRC Advanced Research Fellow. He has been Director for the Centre of Doctoral Training in Composites since 2008 where he has overseen the graduation of >100 PhD students. His research team have won six best paper awards in recent years and Paul has successfully supervised 34 PhD students to completion and has published in excess of 250 refereed journal and conference articles.

Monday September 24, 2018

7:30 AM	***Continental Breakfast - Emerald Ballroom, 3rd floor***						
8:00 AM	**Opening Plenary Lecture: Aerospace And Composites: Together, We Change The World - Dr. Greg Hyslop - *Emerald Ballroom, 3rd floor***						
Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill
Parallel Sessions 1	1A	1B	1C	1D	1E	1F	1G
Track	I2: Impact Dynamic Response 1	P1: Processing & Manufacturing 1	P2: Progressive Damage and Failure Analysis of Composites 1	I1: ICME of Composites 1	T1: Test and Characterization Methods 1	M3: Molecular Modeling of Nanomaterials and Nanocomposites 1	N3: Next Generation Composites: Constituents and Microstructures 1
9:00 AM	Paper# 163	Keynote	Paper# 74	Paper# 122	Paper# 342	Paper# 133	Paper# 382
	3D Progressive Failure Modeling of Drop-Weight Impact on Composite Laminates *Dinh Chi Pham, Jim Lua* and Dianyun Zhang*	Integrated Process Models for Predicting Residual Stress and Geometrical Variations in Resin Transfer Molded Composite Structures *Dianyun Zhang *, Weijia Chen, and James Roach*	Computationally Efficient Damage and Residual Strength Predictions using Progressive Damage Failure Analysis (PDFA) with an Enriched Shell Element *Tyler Goode*, Mark McElroy, Nathan Sesar and Mark Pankow*	NASA's 2040 Vision Roadmap Study: A Framework for Integrated Computational Materials Engineering (ICME) *Steven Arnold**	Characterizing Fiber Reinforced Polymer Composites Shear Behavior with Digital Image Correlation *Qi An*, Matthias Merzkirch and Aaron Forster*	Molecular Dynamics Simulations of Fiber-Sizing Interphase *Sanjib Chowdhury*, Robert Elder, Timothy Sirk, David Hartman, John Gillespie Jr. and Ethan Wise*	A Vision for the Next Generation Composites *Dwayne D. Arola, Xiasong Li, C. Luscombe, F. Ohuchi, T. Okabe, M. Salviato*
9:25 AM	Paper# 246	Keynote - continued	Paper# 63	Paper# 262	Paper# 131	Paper# 156	Paper# 348
	Low Velocity Impact Simulation of CFRP Laminates Considering Microscopic Damage Interaction *Masaya Ebina*, Akinori Yoshimura, Yuichiro Aoki and Kenichi Sakaue*		Computationally efficient interface modeling in fiber-reinforced composites through displacement-based component-wise approach *Ibrahim Kaleel*, Marco Petrolo and Erasmo Carrera*	Prepreg Platelet Molded Composites Process and Performance Analysis *Benjamin Denos*, Sergii Kravchenko, Drew Sommer, Anthony Favaloro, R. Byron Pipes and William Avery*	Characterization of Mode I Interlaminar Fracture Toughness in Composite Materials Using Wedge Loaded DCB Specimens *Sota Oshima*, Akinori Yoshimura, Yoshiyasu Hirano and Toshio Ogasawara*	Atomistic scale simulation for the inter-diffusion of Epon 828 and Jeffamine *Jejoon Yeon*, Sanjib Chowdhury, Chaitanya Daksha and John Gillespie Jr.*	Novel Engineered Composite Materials for Protection Inspired by Natural Dermal Armors *Anqi Lin*, Sean S. Ghods. and Dwayne Arola*
9:50 AM	Paper# 309	Paper# 271	Paper# 92	Paper# 145	Paper# 114	Paper# 207	Paper# 302
	Prediction of delamination area of laminated composite under low velocity impact based on experimentally validated finite element modeling and machine learning methods *Shiyao Lin, Kuo Tian and Anthony Waas**	Deployable Structures Constructed from Composite Origami *James O'Neil*, Antonio Alessandro Deleo, Hiromi Yasuda, Marco Salviato and Jinkyu Yang*	Progressive Failure Mechanism of FRP Composite Laminates with Discrete Element Method *Lei Wan*, Dongmin Yang and Yong Sheng*	Effects of Manufacturing-induced Residual Stress on the Strength of an L-Shaped Textile Composite Flange *James Roach, Weijia Chen and Dianyun Zhang**	Micro Punch Shear Testing of Unidirectional Composites: A New Test Method *John Gillespie Jr.*, Molla Ali, Daniel O'Brien, Chian Yen and Bazle (Gama) Haque*	Molecular Dynamics for the Prediction of the Interfacial Shear Stress and Interface Dielectric Properties of Carbon Fiber Epoxy Composites *Rajni Chahal*, Ashfaq Adnan, Kenneth Reifsnider, Rassel Raihan, Yuan Ting Wu, Vamsee Vadlamudi and Muthu Ram Prabhu Elenchezhian*	Long-term Stress Rupture Limitations of Unidirectionasl High Strain Composites in Bending *Kamron Medina*, TJ Rose and Will Francis*
10:15 AM	***Networking Break - 4th floor foyer***						

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill
Parallel Sessions 2	2A	2B	2C	2D	2E	2F	2G
Track	I2: Impact Dynamic Response 2	P1: Processing & Manufacturing 2	P2: Progressive Damage and Failure Analysis of Composites 2	I1: ICME of Composites 2	T1: Test and Characterization Methods 2	M3: Molecular Modeling of Nanomaterials and Nanocomposites 2	S2: Solvay Student Competition
10:30 AM	Paper# 161 Validation of Compression-after-Impact experiments using ABAQUS simulations *Arun Krishnan*, Shenal Perera and Waruna Seneviratne*	Paper# 2 In-Situ Co-Extrusion: Additive Manufacturing of Continuous Reinforced Thermoplastic Composites *James Garofalo* and Daniel Walczyk*	Keynote Hierarchical, Concurrent, and Synergistic Multiscale Modeling of Progressive Damage and Inelasticity in Composites *Evan Pineda*, Brett A. Bednarcyk, Subodh K. Mital, Steven M. Arnold*	Paper# 13 Conjugate Stress/Strain Pair Approach for Anisotropic Materials *Veysel Erel*, Mingliang Jiang, Alan D. Freed*	Paper# 230 Computational Study for Size Effect in Composites and Nanocomposites *Antonio Alessandro Deleo* and Marco Salviato*	Paper# 57 Reactive Molecular Dynamics Simulation of Accelerated Cross-linking and Disintegration of Bisphenol F/DETDA Polymer using ReaxFF *Aniruddh Vashisth*, Chowdhury Ashraf, Charles Bakis and Adri van Duin*	Paper# 339 Effect of Consolidation Pressure on the Transverse Compressive Strength of UHMWPE Composites at High Strain-rates *Jason Parker* and K.T. Ramesh*
10:55 AM	Paper# 83 Evaluation of Compression Strength after Low Velocity Impact *Nathan Sesar*, Mark Pankow and Greyson Hodges*	Paper# 71 Producibility Considerations for Carbon Fiber/Epoxy Prepregs for Use in Aerospace Propulsion Structures *Allison Horner* and Kevin Obrachta*	Keynote - continued	Paper# 67 CT data based multiscale virtual material characterization of textile composites in ESI Virtual Performance Solution (VPS) *Patrick de Luca*, Sebastian Mueller, Benjamin Boniface and Sylvain Genot*	Paper# 165 A Double Compliances Method for Measuring the Mode I Interlaminar Fracture Toughness of Composite: Theory and Applications *Wu Xu*, Zhuangzhuang Guo, Yin Yu, Xiaojing Zhang and Xinying Lv*	Paper# 363 Atomistic Design of Carbon Nanotube Junctions of Arbitrary Junction Geometry *Vikas Varshney, Vinu Unnikrishnana, Jonghoon Lee, Sangwook Sihn and Ajit Roy**	Paper# 49 Length-Scale Effect On Fracture Behavior Of Nano-Composites *Anubhav Roy* and Samit Roy*
11:20 AM	Paper# 46 A Material Model Development and Validation for Dynamic Response of a Composite Intrusion Beam *Ali Seyed Yaghoubi and Venkat Aitharaju**	Paper# 41 A Multi-Scale Viscoelastic Processing Model for Predicting Residual Stress Buildup in Thermoset Composites *Weijia Chen* and Dianyun Zhang*	Paper# 327 Effect of Edge Distance to Diameter Ratio on Progressive Failure of Bolted Joints in Laminated Composites *Pranav Borwankar*, Andrea Fontanelli and Satchi Venkataraman*	Paper# 359 Material Simulation's Advantage: An illustration with 3D Woven *Anthony Cheruet and Bobby Cook**	Paper# 11 A novel test method to induce bi-axial stress states in thin-ply carbon composites under combined longitudinal tension and transverse compression *Tamas Rev*, Gergely Czél and Michael R. Wisnom*	Paper# 234 Molecular Dynamics Study for Self-Sensing/Self-Healing Materials to Simulate Damage Detection and Repair in Thermoset Polymer Matrix *Bonsung Koo*, Ryan Gunckel, Aditi Chattopadhyay and Lenore Dai*	Paper# 268 Material Characterization and Finite Element Modeling for the Forming of Highly Oriented UHMWPE Thin-Film and Unidirectional Cross-ply Composites *Kari White*, Michael Yaeger, James Sherwood, Travis Bogetti and Julia Cline*

Monday - continued

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill
11:45 AM	Paper# 146 Verification and Validation of a Generalized Orthotropic Material Model MAT213 Implemented in LS-DYNA *Loukham Shyamsunder*, Bilal Khaled, Nathan Holt, Canio Hoffarth, Subramaniam Rajan, Robert Goldberg, Kelly Carney, Paul DuBois and Gunther Blankenhorn*		Paper# 9 A blended damage and fracture mechanics model for progressive damage analysis of notched composite structures *Alexander van Oostrum, Bjorn van Dongen and Dimitrios Zarouchas**		Paper# 62 Effect of Temperature and Strain Rate on Damage Accumulation Behavior of Unidirectional CFRP *Takenobu Sakai*, Satoru Abe and Kensuke Kageyama*		Paper# 109 Optimization and polynomial chaos-based uncertainty analysis of additively manufactured polymer composites *Easir Arafat Papon*, Sameer B. Mulani and Anwarul Haque*
12:10 PM	**Luncheon Speaker: Automotive Composites - 30 Years of Challenges, Collaborations, Innovations and Advanced Developments - Dr. Khaled Shahwan - *Emerald Ballroom, 3rd floor***						
Parallel Sessions 3	3A	3B	3C	3D	3E	3F	3G
Tracks	I2: Impact Dynamic Response 3	N3: Next Generation Composites: Constituents and Microstructures 2	P2: Progressive Damage and Failure Analysis of Composites 3	I1: ICME of Composites 3	T1: Test and Characterization Methods 3	M3: Molecular Modeling of Nanomaterials and Nanocomposites 3	F1: Fatigue of Composites 1
1:30 PM	Paper# 123 Shadowed Delamination Area Estimation in UT C-Scans of Impacted Composites Validated by X-Ray CT *Andrew Ellison* and Hyonny Kim*	Keynote Dynamic manipulation of structural responses via mechanical metamaterials *Jinkyu Yang*, Hiromi Yasuda, Rajesh Chaunsali, Hryunryung Kim, Chun-Wei Chen, Xiaotian Shi, Miyazawa Yasuhiro*	Paper# 370 Peridynamics for Progressive Failure Analysis of Composites *Erdogan Madenci*, Mehmet Dorduncu and Nam Phan*	Paper# 365 Modeling-Driven Damage Tolerant Design of Graphene Nanoplatelet/Carbon Fiber/Epoxy Hybrid Composite Panels for Full-Scale Aerospace Structures *Julie Tomasi, William Pisani, Sorayot Chinkanjanarot, Aaron Krieg, Evan Pineda*, Brett Bednarcyk, Sandi Miller, Julie King, Ibrahim Miskioglu and Gregory Odegard*	Paper# 58 Double-Bubble Fuselage Subcomponent Experimental Testing to Support the D8 Composite Fuselage Design *Jeffrey Chambers*, Deborah Hoffman, Abraham Oonnoonny, Clinton Church, Brian Yutko and Larry Wirsing*	Paper# 315 From addition reactions to cross-linked network formation *Jing Li*, Sakamoto Jumpei, Hiroki Waizumi, Yue Huang, Yutaka Oya, Naoki Kishimoto and Tomonaga Okabe*	Paper# 215 Scaling of Fatigue Crack Growth in Pristine Epoxy *Kevin Guo*, Yao Qiao and Marco Salviato*
1:55 PM	Paper# 171 Visualization of Fiber/Matrix Interfacial Transverse Debonding *Jou-Mei Chu*, Benjamin Claus, Boon Him Lim, Daniel O'Brien, Tao Sun, Kamel Fezzaa and Wayne Chen*	Keynote - continued	Paper# 54 Multiscale Failure Analysis for Prediction of Matrix Crack Formation in Polymer-Matrix Composites *Yuta Kumagai*, Yoshiteru Aoyagi and Tomonaga Okabe*	Paper# 210 Prediction of Fiber Reinforced Composite Material Properties Using Collaborative Filtering Techniques *Jonathan Buck, David Najera*, Doug Melville and Eric Jayson*	Paper# 249 Time and Temperature Dependent Stress-Strain Behavior of Unidirectional Carbon Fiber/Polyimide Composites under On-axis and Off-axis Tensile Loading *Ryuunosuke Minegishi*, Toshio Ogasawara, Takuya Aoki, Yuki Kubota, Yuichi Ishida*	Paper# 188 Changes in micro-phase separation of di-block copolymer melts induced by a circle fiber *Yutaka Oya*, Naofumi Umemoto and Tomonaga Okabe*	Paper# 96 Improvement of durability property by using low diameter glass chopped strands *Yosuke Nukui*, Shunsuke Harashima, Akane Takenaga and Tatsuya Mochizuki*

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill
2:20 PM	Paper# 60 Numerical Simulation of Failure Behavior under Impact Loading for Cylindrical Carbon Fiber Reinforced Polymer *Yusuke Sawamura*, Yuta Yamazaki, Jun Koyanagi, Satoru Yoneyama*	Paper# 340 Mechanics of Edge-Cracking and Toughness Determination for Strain Locking Composite Materials *Nicholas Payne* and Kishore Pochiraju*	Paper# 97 Prediction for Stiffness Reduction and Progressive Damage of Composite Laminate Including Ply Cracks *Sota Onodera* and Tomonaga Okabe*	Paper# 341 Microscale Analysis of Virtually Cured Polymer Matrix Composites Accounting for Uncertainty in Matrix Properties During Manufacturing *Sagar Shah and Marianna Maiaru**	Paper# 160 3-D X-ray Tomography for In-Situ Characterization of Progressive Damage Response of Carbon Fiber Laminates Subject to Mechanical Loadings *Joseph Favata*, Dianyun Zhang and Sina Shahbazmohamadi*		Paper# 129 Stiffness Degradation Model for Fatigue Life Prediction of GFRPs under Random Ocean Current Loading *Takuya Suzuki* and Hassan Mahfuz*
2:45 PM	Paper# 282 Quantifying the Delamination of L-Shaped Composite Laminates Under Low Velocity Impact Using X-Ray Computed Tomography *Kenan Cinar, Ibrahim Guven*, Fatih Oz and Nuri Ersoy*	Paper# 264 Investigating Flexural Failure in Carbon Fiber Reinforced Polymer Composites Interleaved with Carbon Nanotube Sheets *Pratik Koirala, Nekoda van de Werken, Xuemin Wang, Monica J. De Andrade, Raquel Ovalle, Ray Baughman, Hongbing Lu and Mehran Tehrani**	Paper# 226 Spectral Stiffness Microplane Model for Unidirectional Composite *Sean Phenisee*, Sung Lin Tien and Marco Salviato*	Paper# 169 An efficient multiscale virtual testing platform for composite via component-wise models *Ibrahim Kaleel, Manish Nagaraj*, Marco Petrolo, Erasmo Carrera and Anthony M Waas*	Paper# 181 A dielectric resonant cavity method for monitoring of damage progression in moisture-contaminated composites *Ogheneovo Idolor*, Rishabh Guha and Landon Grace*		Paper #378 A Continuum Damage Model for Fatigue and its Integration Scheme *Zhenyuan Gao, Liang Zhang, Robert A. Haynes and Wenbin Yu**
3:10 PM	***Networking Break - 4th floor foyer***						
Parallel Sessions 4	4A	4B	4C	4D	4E	4F	4G
Tracks	I2: Impact Dynamic Response 4	P1: Processing & Manufacturing 4	P2: Progressive Damage and Failure Analysis of Composites 4	I1: ICME of Composites 4	T1: Test and Characterization Methods 4	M2: Model-based Design for Manufacturing 1	F1: Fatigue of Composites 2
3:25 PM	Paper# 99 Modelling of lightning strike-induced shock wave damage in CFRP composites *Lin Ye* and Kunkun Fu*	Paper# 98 Examination of pre-gelation behavior in AS4/8552 prepreg composites *Caitlin Duffner*, Navid Zobeiry and Anoush Poursartip*	Paper# 254 Characterization of Cohesive Zone Laws Using Digital Image Correlation *Bastiaan C.W. van der Vossen*, Andrew Makeev*	Paper# 119 3D Continuum Damage Mechanics model with permanent strain *James Dorer* and Xinran Xiao*	Paper# 335 A Method for Rapid Determination of Fiber Orientation in Reinforced Composites at Lab and Component Scale *Matthew Kant* and Dayakar Penumadu*	Paper# 290 Integrated AFP Manufacturing and Stress Analysis/Design Process *August Noevere* and Craig Collier*	Paper# 31 A Cohesive Fatigue Model based on the S-N Diagram *Carlos Davila**

Monday - continued

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill
3:50 PM	Paper# 44 Impact Performance and Flexural Behavior of Composite Sandwich Structures in Low Temperature Arctic Conditions *K.T. Tan* and M.H. Khan*	Paper# 151 Development of composite leaf springs made by 4D printing *Suong Van Hoa**	Paper# 288 Direct Numerical Simulation of 3D Woven Textile Composites Subjected to Compressive Loading: A Multiscale Approach *Deepak Patel* and Anthony M. Waas*	Paper# 84 Multi-scale analysis of joints in hybrid metal/composite structures in ESI Virtual Performance Solution (VPS) *Alexandre Dumon*, Sebastian Mueller, Patrick De Luca and Alain Trameçon*	Paper# 55 Modeling Turf Through Discrete Element Analysis *Justin Rittenhouse* and Peter Gustafson*	Paper# 244 Predicting the influence of manufacturing parameters on curing generated deformations using thermo-mechanical modelling *Kristof Vanclooster*, Jim Gilbert, Frederic Pascon and Stepan V. Lomov*	Paper# 214 Multi-axial Fatigue Behavior of Notched Composite Structures *Yao Qiao*, Antinio Alessandro Deleo, Kuotian Liao and Marco Salviato*
4:15 PM	Paper# 314 Dynamic Impact Behavior of Syntactic Foam Core Sandwich Composites *Peter Breunig, Vinay Damodaran, Kiran Shahapurkar, Sunil Waddar, Mrityunjay Doddamani, P Jeyaraj, G C Mohan Kumar and Pavana Prabhakar**	Paper# 50 Draping Behavior of Non-Crimp Fabrics *William Rodgers*, Praveen Pasupuleti, Selina Zhao, Arnaud Dereims, Mark Doroudian and Venkat Aitharaju*	Paper# 281 Experimental Characterization of Mode I and Mode II Peridynamic Critical Stretch Parameter *Forrest Baber*, Vipul Ranatunga and Ibrahim Guven*	Paper# 379 Powering NASTRAN with SwiftComp for Multiscale Modeling of Composites *Xin Liu, Federico Gasco, Johnathan Goodsell and Wenbin Yu**	Paper# 23 Contamination Transfer from Processing Aid Materials to Prepreg *Akihito Suzuki*, Noriko yamazaki and Shoichi Aoki*	Paper# 220 Symmetrical and Antisymmetrical Sequenced Fibers with Epoxy Resin on Rectangular Reinforced Structures under Axial Loading *Reza Moheimani*, Reza Sarayloo and Hamid Dalir*	Paper# 261 Effect of manufacturing-induced voids on the fatigue performances of multidirectional laminates *Lucio Maragoni, Paolo Andrea Carraro and Marino Quaresimin**
4:40 PM	Paper# 157 Dynamic behavior of carbon fiber reinforced polymer (CFRP) composites at higher strain rates *Muhammad Hashim, David Roux and Alireza Amirkhizi**	Paper #45 A novel and sustainable approach to recycle prepreg trim waste via sheet molding compound (SMC) technique *Sanzida Sultana, Pete George, Jonathan Colton and Kyriaki Kalaitzidou**	Paper# 224 Effects of out of plane stress on progressive kinking in internal zero plies *Paul Davidson* and Anthony Waas*		Paper# 82 Pseudo-ductility of Unidirectional Thin Ply Hybrid Composites in Longitudinal Compression *Putu Suwarta*, Gergely Czel, Mohamad Fotouhi, Jakub Rycerz and Michael Wisnom*	Paper# 135 A Numerical Model to Simulate Void Dynamics During Processing of Honeycomb Core Sandwich Structures with Prepreg Face-Sheets *Navid Niknafs Kermani*, Pavel Simacek, Merve Erdal and Suresh G.Advani*	Paper# 277 Damage evolution in U-shaped composite beams loaded in fatigue *Ritika Singh* and Mark Tuttle*
5:05 PM	***Networking Break - 4th floor foyer***						
5:15 PM	**General Session - *Emerald Ballroom, 3rd floor***						
6:00 - 7:30 PM	**Welcome Reception - *Emerald Ballroom, 3rd floor***						

Tuesday September 25, 2018

7:30 AM	***Continental Breakfast - Emerald Ballroom, 3rd floor***						
8:00 AM	**Plenary Session: Integrated In-Process Monitoring of High-Rate Production CFRP Structures for Material Quality Assurance - *Dr. Nobuo Takeda- Emerald Ballroom, 3rd floor***						
Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill
Parallel Sessiosn 5	5A	5B	5C	5D	5E	5F	5G
Track	I2: Impact Dynamic Response 5	P1: Processing & Manufacturing 5	N2: NASA ACC Predictive Capabilities for Impact, PDA and AFP 1	M1: Micromechanics 1	M2: Model-based Design for Manufacturing 2	N4: Non-Traditional Laminate Applications in AFP Rate Optimization 1	N1: Nanostructured Composites 1
9:00 AM	Paper# 352	Paper# 212	Paper# 47	Paper# 179	Paper# 159	Paper# 372	Paper# 354
	Multiscale Modeling of the Impact Response of Triaxially Braided Polymer Matrix Composites, Including Effects of Adiabatic Heating *Christopher Sorini*, Aditi Chattopadhyay and Robert Goldberg*	Delamination Resistance and Size Effect in Discontinuous Fiber Composites *Rohith Jayaram*, Seunghyun Ko, Jinkyu Yang and Marco Salviato*	Validation of a Mesoscale Fiber Kinking Model through Test and Analysis of Double Edge Notch Compression Specimens *Andrew Bergan* and Wade Jackson*	Discrete Damage Modeling for a Transverse Compression Experiment of a Polymer Matrix Composite *Mark Flores*, Nathan Sesar, Bob Wheeler, Andrew Sharits and David Mollenhauer*	Statistical Machine Learning and Sampling for Composite Fabrication and Performance *Loujaine Mehrez, Ziad Ghauch, Venkat Aitharaju, William Rodgers, Praveen Pasupuleti, Arnaud Dereims and Roger Ghanem**	Fiber Angle Optimization and Tow Path Planning on 3D Curved Surfaces Using the Multiple Mesh Approach *Floris-Jan van Zanten*, Caleb Pupo, Darun Barazanchy and Michel van Tooren*	Interfacial Thermal Resistance Based Effective Thermal Properties of Nanocomposite systems at Various Strain States: A multiscale Computational Approach *Sushan Nakarmi, Vinu U. Unnikrishnan**
9:25 AM	Paper# 286	Paper# 239	Paper# 116	Paper# 174	Paper# 295	Paper# 100	Paper# 245
	Modeling Impact and Mechanical Response of Carbon-Fiber Reinforced Polymer Composites *Alexander Carpenter*, Sidney Chocron, Rory Bigger, Nikki Scott and Kyle Warren*	Experimental Study of In-plane Shear Response of Interface Toughened Carbon Fiber Composites *Minh Nguyen*, Avinkrishnan Vijayachandran, Paul Davidson and Anthony Waas*	A Benchmark Example for Delamination Propagation Predictions Based on the Single Leg Bending Specimen under Quasi-static and Fatigue Loading *Ronald Krueger*, Lyle Deobald and Haozhong Gu*	Failure in Unidirectional Composites With Nonuniform Fiber Distribution Under Combined Transverse Tension and Axial Shear *Sarah Elnekhaily and Ramesh Talreja**	Techno-Economic Model and Simulation for Wind Blade Manufacturing *Stephen Johnson*, Matteo Polcari and James Sherwood*	Manufacturing and evaluation of an optimized composite panel with a cut-out *Yuichiro Aoki*, Sunao Sugimoto, Yutaka Iwahori and Toshiya Nakamura*	Quantitative Microscopic Investigation of Mode I Fracture Surfaces of Nanosilica-Filled Epoxies *Aniruddh Vashisth, Todd Henry and Charles Bakis**
9:50 AM	Paper# 22	Paper# 316	Paper# 150		Invited Paper	Paper# 371	
	Dynamic response and validation of a flexible matrix composite *Daniel Whisler*, Rafael Consarnau and Ezequiel Buenrostro*	Automated Construction and Insertion of Layer-by-Layer Finite Element Sub-Models of Damaged Composites *Stephen Holland*, Adarsh Krishnamurthy, Onur Bingol and Robert Grandin*	A Multiscale Two-Way Thermomechanically Coupled Micromechanics Analysis of the Impact Response of Thermo-Elastic-Viscoplastic Composites *Brett Bednarcyk, Steven Arnold*, Evan Pineda and Jacob Aboudi*		Composite Free-Size Design Optimization Method for Efficient and Manufacturable Anisotropic Designs *Jeff Wollschlager**	Strength Prediction of Non-Conventional Laminates by Incorporating Intralaminar Shear Stresses *Darun Barazanchy* and Michael van Tooren*	
10:15 AM	***Networking Break - 4th floor foyer***						

Tuesday - continued

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill
Parallel Sessions 6	6A	6B	6C	6D	6E	6F	6G
Track	I2: Impact Dynamic Response 6	P1: Processing & Manufacturing 6	T1: Test and Characterization Methods 5	M1: Micromechanics 2	S3: Special Session Honoring Dr. T Kevin O'Brien 1	N4: Non-Traditional Laminate Applications in AFP Rate Optimization 2	N1: Nanostructured Composites 2
10:30 AM	Paper# 39	Paper# 243	Paper# 213	Paper# 265	Keynote	Paper# 240	Paper# 78
	The impact resistance of thermoplastic fiber-metal laminates based on glass and basalt fibers *Fabrizio Sarasini*, Jacopo Tirillò, Luca Ferrante, Claudia Sergi, Pietro Russo, Giorgio Simeoli and Andrea Calzolari*	Micromechanical prediction of a composite failure under longitudinal compression *Zheng-Ming Huang* and Y. Zhou*	Modeling the microbond test of different sizes of droplets to quantify the failure properties of fiber-matrix interface *Taichi Yamaguchi*, Gaku Hashimoto and Hiroshi Okuda*	Multiscale Progressive Damage Analyses for Fiber Reinforced Composites Subjected to Biaxial Loading *Eyass Massarwa*, Ido Meshi, Jacob Aboudi and Rami Haj-Ali*	Study of Skin-Stringer Separation in Postbuckled Composite Aeronautical Structures *Chiara Bisagni, Luc Kootte, Carlos Dávila and Vipul Ranatunga*	Buckling Performance Optimization of Steered Composite Panels while Accounting for Manufacturing Constraints *Avinkrishnan Vijayachandran*, Minh Nguyen, Paul Davidson, Andrew Purvis, John Nancarrow and Anthony Waas*	Modeling of Polymer/ Carbon Nanotube Nanocomposite to Estimate Structural Damping in a Rotorcraft Blade *Keerti Prakash*, Edward Smith and Charles Bakis*
10:55 AM	Paper# 310	Paper# 70	Paper# 143	Paper# 138	Keynote - continued	Paper# 187	Paper# 33
	Micromechanical Progressive Failure Analyses of Composite Materials Using Continuum Decohesive Finite Element *Shiyao Lin* and Anthony Waas*	Simulation on kink-band formation based on X-ray computed tomography modeling *Takuya Takahashi*, Masahito Ueda, Keisuke Iizuka and Akinori Yoshimura*	Carbon Unidirectional Composite Flexure Strength Dependence on Laminate Thickness *TJ Rose*, Ajay Sharma, Andrew Seamone, Francisco López Jiménez and Tom Murphey*	Coupled Thermo-mechanical Micromechanics Modeling of the Influence of Thermally Grown Oxide Layer in an Environmental Barrier Coating System *Trenton Ricks*, Steven Arnold and Bryan Harder*		Optimization of fiber arrangement around circular hole considering curve shaping by AFP *Kenta Mitsui*, Ryosuke Matsuzaki, Yoshiyasu Hirano, Akira Todoroki and Yoshihiro Suzuki*	Improving the Interlaminar Strength of Carbon Fiber Reinforced Polymer Composite Laminates using Cellulose Nanocrystals *Annuatha Kumar, Anjali Budhani, Minh Tran and Amir Asadi**
11:20 AM	Paper# 180	Paper# 328	Paper# 85	Paper# 343	Paper# 137	Paper# 89	Paper# 305
	Modeling and Simulation of Carbon Composite Blast Behavior *Chian-Fong Yen*, Robert Kaste, Charles Chih-Tsai Chen and Nelson Carey*	A Machine Learning Technique to Predict Biaxial Failure Envelope of Unidirectional Composite Lamina *Faisal Bhuiyan*, Lars Kotthoff and Ray Fertig*	Numerical and experimental assessment of a modified Transverse Cut Tension (TCT) specimen for in-situ loaded X-ray computed tomography of Mode II dominated composite damage progression *Alex Harman*, David Mollenhauer, P. Frezza, Waruna Seneviratne, John Wang and Paul Chang*	Meso-Scale Strain Measurements in Fiber Reinforced Composites *Behrad Koohbor*, Christopher Montgomery, Scott White and Nancy Sottos*	VCCT with Progressive Nodal Release for Simulating Mixed-Mode Delamination: Formulation, Algorithmic Improvements and Implications *Gerald Mabson*, Nelson De Carvalho and Ronald Krueger*	Optimum design of lay-up configuration and ply drop-off placement for tapered composite laminate *Shinya Honda*, Kosuke Takahashi, Tetsuya Higuchi and Ryotaro Takeuchi*	Experimental Evaluation of Carbon Nanotubes for High-Stiffness Damping Augmentation in Carbon/Epoxy Composites *Jeffrey Kim*, Charles Bakis and Edward Smith*

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill
11:45 AM	Paper# 194 Effect of transverse compression on the residual tensile strength of UHMWPE yarns *Karan Shah*, Suraj Ravindran, Subramani Sockalingam and Addis Kidane*	Paper# 35 Creating Flexible Structures out of MDF Plates *Renzhe Chen, Mingliang Jiang, Negar Kalantar, Michael Moreno and Anastasia Muliana**	Paper# 103 Determination of Full Elastic Constants of Carbon Fiber in Carbon Fiber Reinforced Plastic Composites *Go Yamamoto*, Shogo Kurisak, Satoshi Atobe and Tomonaga Okabe*	Paper #36 Tensile and compressive failure behaviors of triaxially braided composite *Zhenqiang Zhao*, Chao Zhang, Yulong Li*	Paper# 72 Benchmarking Mixed Mode Matrix Failure in Progressive Damage and Failure Analysis Methods *Frank Leone*, Madhavadas Ramnath, Imran Hyder, Joseph Schaefer and Gerald Mabson*		
12:10 PM	**Luncheon Speaker: Digital Manufacturing Composites: Past, Present, and Future - Dr. Anoush Poursartip - *Emerald Ballroom, 3rd floor***						
Parallel Sessions 7	7A	7B	7C	7D	7E	7F	7G
Track	O1: ONR Sponsored Session 1	E1: Effects of Defects 1	T1: Test and Characterization Methods 6	M1: Micromechanics 3	N2: NASA ACC Predictive Capabilities for Impact, PDA and AFP 2	S4: Stochastic Modeling and Analysis of Composites 1	N1: Nanostructured Composites 3
1:30 PM	Paper# 128 Multiscale Modeling of Crack Formation in Composite Laminates with Manufacturing Defects *Ramesh Talreja**	Paper# 237 Effect of Automated Fiber Placement (AFP) Manufacturing Induced Imperfections on Composite Performance *Minh Nguyen*, Avinkrishnan Vijayachandran, Paul Davidson, Damon Call, Dongyeon Lee and Anthony Waas*	Paper# 81 Characterization of Polymer Matrix Composite Ply Thickness *Megan Imel*, Amanda K. Criner and Mark Flores*	Paper# 61 XIGA based intralaminar and translaminar fracture analysis of unidirectional CFRP laminate *Vikas Kaushik* and Anup Ghosh*	Paper# 193 Implementation of a Matrix Crack Spacing Parameter in a Continuum Damage Mechanics Finite Element Model *Imran Hyder*, Frank Leone, Brian Justusson, Joseph Schaefer, Andrew Bergan and Steven Wanthal*	Paper# 43 Survey of Sensitivity Analysis Methods During the Simulation of Residual Stresses in Simple Composite Structures *Stacy Nelson*, Alexander Hanson, Brian Werner, Kevin Nelson and Timothy Briggs*	Paper# 272 Variability of Mechanical and Dielectric Properties in Testing Electrospun PAN Nanofiber Mat *Blesson Isaac, Robert Taylor*, Kenneth Reifsnider, Rassel Raihan and Ashfaq Adnan*
1:55 PM	Paper# 257 Identification of the Dynamic Behavior of Composites using the Virtual Fields Method *Leslie Lamberson*, Xavier Cadiot, Llody Fletcher and Fabrice Pierron*	Paper# 130 Effect of stacking sequence on compressive strength reduction of aircraft composite structures *Kosuke Oka*, Masahiro Kashiwagi, Kazuhiro Miura, Yukihiro Sato, Toshio Abe and Kiyoka Takagi*	Paper# 8 In situ X-CT Observation of Crack Initiation and Propagation in CFRP with X-ray Microscopy *Masao Kimura*, Yasuo Takeichi, Yasuhiro Niwa and Toshiki Watanabe*	Paper# 307 Progressive, Large-Scale Damage Modeling in Ultra Short Fiber Tailorable Feedstock Composite Materials *Garrett Nygren, Ryan Karkkainen*, Young Kim*	Paper# 124 Discrete Damage Modelling of Clamped Tapered Beam Specimen under Fatigue Loading *Hari K. Adluru*, Endel V. Iarve, and Kevin H. Hoos*	Paper# 280 Analysis of Open Hole Tensile Strength in a Prepreg Platelet Molded Composite with Stochastic Meso-Structure *Sergii Kravchenko*, Drew Sommer, Benjamin Denos, Anthony Favoloro, William Avery and Byron Pipes*	Paper# 152 Nanocomposites: Manufacturing, Microstructural Characterization and Mechanical Testing *Petar Dotchev, Eric Steinmetz, Seyed Sanei* and Jason Williams*

Tuesday - continued

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill
2:20 PM	Paper# 325 Intraply Fracture in Fiber-Reinforced Composites: a Peridynamic Analysis *Florin Bobaru*, Javad Mehrmashhadi, Ziguang Chen, and Sina Niazi*	Paper# 242 Ply-Orientation Dependence of Notched Strength of Multidirectional CFRP Laminates and Prediction Using a Finite Fracture Mechanics Model *Masamichi Kawai* and Masato Suzuki*	Paper# 27 Nano mechanical testing for in situ X-CT observation of CFRP *Toshiki Watanabe*, Yasuo Takeichi, Yasuhiro Niwa and Masao Kimura*	Paper# 208 Thermal Failure of Composites under Heat Flow *Seiichi Nomura* and Behrooz Karimi*	Paper# 105 Discrete Damage Modeling of Matrix Dominated Failure Including Random Spatial Variation of Strength *Kevin Hoos* and Endel Iarve*	Paper# 347 Comparison of Fiber Microstructural Characteristics for Two Grades of Carbon Fiber Composites *Scott Stapleton*, Michael Uchic, Craig Przybyla, Helga Krieger, Lars Appel, Simon Zabler and Mathew Shey*	Paper# 186 Fabrication of Cellulose Nanofiber/Glass Fiber-reinforced Composites and Their Bending Behavior Evaluation *Yingmei Xie*, Risa Honda, Kenichi Katabira, Hiroki Kurita and Fumio Narita*
2:45 PM	Paper# 90 A New Approach to Alleviating Mesh Size Independence in Multiscale Fatigue Life Prediction in Composites *Caglar Oskay* and Chengzhi Tian*	Paper# 236 Multiscale Analysis of CFRP Laminates Including the Effect of Fiber Waviness *Akinori Yoshimura**	Paper# 189 Study of Skin-Stringer Separation in Postbuckled Composite Aeronautical Structures *Luc Kootte*, Chiara Bisagni, Carlos Dávila and Vipul Ranatunga*	Paper# 94 Analytical Prediction of Tensile Strength Prediction for Two-Dimensional Triaxially Braided Composite *Haoyuan Dang*, Zhenqiang Zhao, Yulong Li and Chao Zhang*	Paper# 241 Bmanc—A versatile software for failure analysis of a composite structure essentially upon original constituent properties *Zheng-Ming Huang*, J.J. Gu and Y.C. Wang*		
3:10 PM	***Networking Break - 4th floor foyer***						
Parallel Sessions 8	8A	8B	8C	8D	8E	8F	8G
Track	O1: ONR Sponsored Session 2	E1: Effects of Defects 2	N3: Next Generation Composites: Constituents and Microstructures 3	C3: Crashworthiness	N2: NASA ACC Predictive Capabilities for Impact, PDA and AFP 3	S4: Stochastic Modeling and Analysis of Composites 2	N1: Nanostructured Composites 4
3:25 PM	Paper# 115 Atomistically-informed continuum modeling of damage mechanisms in radially-grown CNT nanocomposites *Karthik Rajan Venkatesan*, Nithya Subramanian and Aditi Chattopadhyay*	Paper# 118 Global Prediction of Discrete Local Damage Interactions Using Broadband Dielectric Spectroscopy *Vamsee Vadlamudi*, Muthu Ram Prabhu Elenchezhian, Rauhon Ahmed Shaik, Aishwarya Nandini, Rassel Raihan Md., Kenneth Reifsnider and Endel Iarve*	Keynote Next generation composites in aerostructures *Tia Benson-Tolle**	Paper# 80 Progressive Axial Crushing of Composite Laminates: A Comparison between LS-DYNA Continuum Damage Models *Johannes Reiner and Reza Vaziri**	Paper# 166 High Rate Testing of Composite Fastener Joints with and without Clamp-up *Suresh Keshavanarayana, Adrian Gomez, Akhil Bhasin, Aswini Kona*, Luis Castillo, Akhil Bhasin, Jenna Pang, Matt Molitor and Mostafa Rassaian*	Paper# 312 Stochastic Process Modeling of a Prepreg Platelet Molded Composite Bracket *Drew E. Sommer*, Anthony J. Favaloro, Sergii G. Kravchenko, Benjamin R. Denos and R. Byron Pipes*	Paper# 125 Dispersion and Properties of Graphene Oxide and Reduced Graphene Oxide in Nanocomposites *Melanie Schneider, Pouria Khanbolouki, Nekoda van de Werken, Elijah Wade, Reza Foudazi and Mehran Tehrani**

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill
3:50 PM	Paper# 136 Multi-functional Nano-porous Ceramics *Namiko Yamamoto*, Jingyao Dai and Jogender Singh*	Paper# 101 Effect of intralaminar failure properties on compressive strength of CFRP structure after edge-on impact *Yukihiro Sato*, Masahiro Kashiwagi, Kazuhiro Miura, Yoshinori Nonaka, Toshio Abe and Kiyoka Takagi*	Keynote - *continued* Next generation composites in aerostructures *Tia Benson-Tolle**	Paper# 56 Numerical modelling of impact damage in fibre-reinforced plastic composites with smoothed particle hydrodynamics *Tomonaga Okabe*, Shohei Natsui and Sota Onodera*	Paper# 134 A Nonlocal Progressive Damage Model for Composite Materials *Karan Kodagali* and Subramani Sockalingam*	Paper# 190 Experimental and Numerical Characterization of the Intra-Laminar Fracturing Behavior in Discontinuous Fiber Composite Structures *Seunghyun Ko*, Kenrick Chan, Reed Hawkins, Rohith Jayaram, Christopher Lynch, Reda El Mamoune, Minh Nguyen, Nicolay Pekhotin, Natania Stokes, Daniel N. Wu, Mark Tuttle, Jinkyu Yang and Marco Salviato*	Paper# 53 Cycloaliphatic epoxy –silica nanocomposite provided from perhydropolysilazane *Reiko Saito*, Tetsuo Sakaguchi and Akio Takasugi*
4:15 PM	Paper# 107 Material State Monitoring using Embedded Sensors for Validating Models for Detecting Process-Induced Damages in Polymer Composites *Waruna Seneviratne*, John Tomblin, Shakya Liyanage and Hemal Shah*	Paper# 289 Effects of Localized Manufacturing-Induced Defects in Wind Turbine Blades *Juan Su*, Scott Stapleton, Stephen Johnson, Stephen Nolet, Nicholas Althoff and James Sherwood*	Paper# 167 Ply Curving Termination for Suppressing Delamination in Composite Ply Drop-Off *Shu Minakuchi**	Paper# 64 Mechanisms of Energy Absorption in Hybrid Material Systems consisting of Sheet Metal and Advanced Composites under Bending Load *Thomas Soot*, Michael Dlugosch, Jens Fritsch and Dirk Lukaszewicz*	Paper# 211 Non-Local Damage Modeling for Composite Laminates: Application to Isogeometric Analysis for Impact Simulations *Marco Simone Pigazzini, David Kamensky*, Dennis van Iersel, Joris Remmers and Yuri Bazilevs*	Paper# 158 Fabrication to Performance: A Comprehensive Multiscale Stochastic Predictive Model for Composites *Roger Ghanem*, Ziad Ghauch, Venkat Aitharaju, William Rodgers, Praveen Pasupuleti, and Arnaud Dereims*	Paper# 172 Manufacturing Process of CNT/BMI Composites and CF/CNT Hybrid Composites with Continuously-spun CNT Prepregs Synthesized by FCCVCD *Liyu Dong*, Branden Leonhardt, Meagan Raley, Songlin Zhang, Ayou Hao, Jin Gyu Park and Richard Liang*
4:40 PM	Paper# 153 Effect of Geometrical Imperfections on Structural Integrity of Laminated Composite Structures: Experimental Approach and Characterization *Mark Gurvich*, Patrick Clavette, SeungBum Kim, George Zafiris, Nam Phan and Anisur Rahman*		Paper# 168 Microscale Simulation of Composites with Various Microstructures by Using eXtended Finite Element Method (XFEM) *Ryo Higuchi*, Tomohiro Yokozeki, Tomonaga Okabe, Toshio Nagashima and Takahira Aoki*	Paper# 29 Crush Response of Prepreg Platelet Molding Compound Tubes *Rebecca Cutting*, Varna Sharma and Johnathan Goodsell*	Paper# 175 Experimental investigation into the failure of CFRP T-joints under ice impact and quasi-static loadings *Huawen Zhang*, Huifang Liu, Zhenqiang Zhao, Yulong Li, Chao Zhang*	Paper# 75 Uncertainty Quantification of Simulated Residual Stresses in Multi-Material Composite Structures *Alexander Hanson*, Stacy Nelson, Brian Werner and Timothy Briggs*	
5:05 - 6:00 PM	**No-Host Social - *3rd floor foyer***						
5:15 - 6:00 PM				**ASC Technical Division Meeting Analysis & Testing Division**	**ASC Technical Division Meeting Durability & Damage Tolerance Division**	**ASC Technical Division Meeting Emerging Composites Technologies Division**	**ASC Technical Division Meeting Design & Manufacturing Division**
6:00 - 8:00 PM	**Awards Banquet Speaker: Steve Chisholm,** Vice President and Senior Chief of Structures Engineering, Boeing Commercial Airplanes (BCA) - ***Emerald Ballroom, 3rd floor***						

Wednesday September 26, 2018

7:15 AM	***Continental Breakfast - Emerald Ballroom, 3rd floor***							
7:45 AM	**Wayne W. Stinchcomb Memorial Lecture: Crashworthiness: The Next Frontier in Composite Mechanics - *Dr. Daniel O. Adams - Emerald Ballroom, 3rd floor***							
Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill	Blue Mouse Boardroom
Parallel Sessions 9	9A	9B	9C	9D	9E	9F	9G	
Track	O1: ONR Sponsored Session 3	E1: Effects of Defects 3	A1: Adhesive Joints 1	S3: Special Session Honoring Dr. T Kevin O'Brien 2	N2: NASA ACC Predictive Capabilities for Impact, PDA and AFP 4	S4: Stochastic Modeling and Analysis of Composites 3	T2: Textile Composites 1	ASTM Committee D30
8:45 AM	Paper# 87 Multiscale Modeling of Bonded T-Joints using Atomistically Informed Method of Cells *Ashwin Rai* and Aditi Chattopadhyay*	Paper# 251 Matrix Crack Formation and Growth in the Presence of Nonuniform Fiber Distribution and Matrix Voids *Aswathi Sudhir* and Ramesh Talreja*	Paper# 42 State Variable Methods of Assessment, Prognosis, and Control of Composite and Bonded Structures *Kenneth Reifsnider*, MD Rassel Raihan, Vamsee Vadlamudi and Muthu Ram Prabhu Elenchezhian*	Paper# 91 Closed-Form Mixed-Mode Strain Energy Release Rate Expressions for Unidirectional Laminate Configurations *Patrick Enjuto* and Gerald Mabson*	Paper# 191 Quantification of Error Associated with Using Misaligned Meshes in Continuum Damage Mechanics Material Models for Matrix Crack Growth Predictions in Composites *Brian Justusson*, Imran Hyder, Stewart Boyd and Frank Leone*	Paper# 377 The Influence of Variability and Defects on the Structural Performance of Discontinuous Composites *James Finley*, Joël Henry, Soraia Pimenta and Milo S.P. Shaffer*	Paper# 48 Conforming Element Mesh for Realistic Textile Composite Micro-Geometry *Agniprobho Mazumder*, Youqi Wang and Chian Fong Yen*	8:50–10:00 AM ASTM Committee D30.04 Lamina and Laminate Test Methods
9:10 AM	Paper# 263 A stabilized finite element formulation remedying traction oscillations in cohesive interface elements *Gourab Ghosh, Chandrasekhar Annavarapu and Ravindra Duddu**	Paper# 164 Progressive Damage and Failure Prediction of Interlaminar Tensile Specimen with Initial Fabrication Induced Defects *Xiaodong Cui, Anand Karuppiah, Dinh Chi Pham, Jim Lua*, Caleb Saathoff and Waruna Seneviratne*	Paper# 147 Enhancing Damage Tolerance of Composite T-joint Using Fiber-Reinforcement-Based Crack Arrester *Shinsaku Hisada*, Shu Minakuchi and Nobuo Takeda*	Paper# 126 The Importance of Energy Release Rates in Failure of Composites *Michael Wisnom**	Paper# 21 An Engineering Approach to Analyze Damage Initiation Modes in Tapered Composite Structures *Prabhakar Rao*, Mark Gurvich, Upul Palliyaguru and Waruna Seneviratne*	Paper# 155 Stochastic Finite Element Analysis of Composites *Courtney Cole*, Randall Doles and Seyed Hamid Reza Sanei*	Paper# 270 Compressive strength prediction of 3D Woven textile composites: Single RVE multiscale analysis and imperfection sensitivity study *Deepak K. Patel* and Anthony M. Waas*	

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill	Blue Mouse Boardroom	
9:35 AM	Paper# 225 A Comparative Study on Pin Bending Effect Under Bearing Static and Fatigue Failure *Hyonny Kim and Mimi Ngo**	Paper# 337 Effect of defects on the mechanical properties of virtually cured composite structures *Jared Mendez, Eric J. Carey* and Marianna Maiaru*	Paper# 250 Experimental and Computational Investigations of Process-Induced Stress Effects on the Interlaminar Fracture Toughness of Hybrid Composites *Brian Werner* and Stacy Nelson*	Paper# 381 Progress in Failure": Toward Reliable Failure Predictions in Composites *Erian Armanios, Guillaume Seon, Yuri Nikishkov, and Andrew Makeev**		Paper# 346 Meso-Scale Computational Simulation of Mechanical Response of Carbon Nanotube Yarns *Akbar Pirmoz*, Jude C. Anike and Jandro L. Abot*	Paper# 284 Applicability of Two-Step Homogenization in High-Crimp Woven Composites *Higor Silva and Borys Drach**	8:50–10:00 AM ASTM Committee D30.04 Lamina and Laminate Test Methods	
10:00 AM	***Networking Break - 4th floor foyer***								
Parallel Sessions 10	10A	10B	10C	10D	10E	10F	10G	ASTM Committee D30	
Track	O1: ONR Sponsored Session 4	S1: Sandwich Composites 1	A1: Adhesive Joints 2	A3: Automotive Composites 1	M4: Multifunctional Composites 1	S4: Stochastic Modeling and Analysis of Composites 4	T2: Textile Composites 2		
10:10 AM	Paper# 183 Optimization of Carbon Fiber Surfaces for Reinforcement in Advanced Polymer Composites *Luke Henderson*, Russell Varley, Filip Stojcevski, James Randall, Daniel Eyckens, Baris Demir and Tiffany Walsh*	Paper# 324 Low-Velocity Impact Damage of Woven Carbon Sandwich *Alejandra Castellanos* and Pavana Prabhakar*	Keynote Adhesively bonded joints: an industry perspective *Lyle Deobald*	Paper# 218 Application of Laminated Composite Grids as a Reinforcing Element for Automotive Components *Amir Ehsani* and Hamid Dalir*	Paper# 308 Micro-mechanics based modeling of Joule Heating Induced Damage Propagation in Carbon Composite Laminates *Hong Yu*, Dirk Heider and Suresh Advani*	Paper# 73 Multi-objective optimization for coupled mechanics-dynamics analyses of composite structures *Alyssa Skulborstad* and Stacy Nelson*	Paper# 69 Interesting properties of 3D warp Interlock fabrics as fibrous reinforcement for composite material *Axel Kececi, Francois Boussu* and Damien Soulat*	10:15-11:30 AM ASTM Committee D30.06 Interlaminar Properties	

Wednesday - continued

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill	Blue Mouse Boardroom
10:35 AM	Paper# 198 Multifunctional MENs Doped Adhesives for Bond Quality Evaluation *Ping Wang, Daniela Gil, Mauricio Pajon, Brian Hernandez, Juliette Dubon, Benjamin Boesl, Sakhrat Khizroev, Dwayne McDaniel* and Bassim Arkook*	Paper# 178 Debonding of sandwich panels and solid laminates exhibiting fiber bridging *Daniel Höwer*, Kumar Jois, Brett A. Bednarcyk, Evan J. Pineda, Stefanie Reese and Jaan-Willem Simon*	Keynote - continued Adhesively bonded joints: an industry perspective *Lyle Deobald*	Paper# 278 Development of a One-Step Analysis for Preforming of Tri-axial Fiber Reinforced Prepregs *Danielle Zeng*, Xinhai Zhu, Houfu Fan, Zachary Pecchia, Matthew Rebandt and Jeff Dahl*	Paper# 366 Anisotropic Soft Composite Based Hyperelastic Model *Arnab Chanda and Vinu Unnikrishnan**	Paper# 323 Reliability-Based Approach for Sandwich Composite Structural Applications *Sadra Emami*, Elias Toubia and Kellie Schneider*	Paper# 300 Pseudo-ductile Composites with Micro-wrapped Hybrid Tow *Mohammad Islam, Vivek Koncherry, Prasad Potluri* and Michael Wisnom*	10:15-11:30 AM ASTM Committee D30.06 Interlaminar Properties
11:00 AM	Paper# 197 Hybrid Structured Phenylethynyl Silsesquioxane Resin Composites *Andre Lee*, David Vogelsang, Jonathan Dannatt and Robert Maleczka*	Paper# 34 Modeling Nonlinear and Tme-Dependent Behaviors of Polymeric Sandwich Composites at Various Environmental Conditions *Bentolhoda Davoodi, Antonio Gomez, Brian Pinto, Anastasia Muliana* and Valeria La Saponara*	Paper# 15 Residual Tensile Strength of Adhesively Bonded Double Lap Joints after Transverse Impact *Aakash Paul*, Xiaodong Xu, Michael R. Wisnom and Takayuki Shimizu*	Paper# 296 Basalt Fiber based Sheet Molding Compound and Composites for Automotives *Dayakar Penumadu*, Stephen Young and Hendrik Mainka*	Paper# 65 On The Use of Multifunctional Z-Pins For Sensing Internal Damage in Composite Laminates Based on Electrical Resistance Measurements *Robert Hart**	Paper# 113 Micromechanical Finite Element Modeling of Micro Punch Shear Experiments on Unidirectional Composites *Bazle (Gama) Haque*, Molla Ali, Raja Ganesh, Sandeep Tamrakar, Daniel O'Brien, Chian Yen and John Gillespie Jr.*	Paper# 267 Measurement of intrinsic residual stresses in 3D woven composites using measurement of the displacement fields from hole drilling by electronic speckle pattern interferometry and digital image correlation *Todd Gross*, Hilary Buntrock, Igor Tsukrov, Borys Drach, Kostiantyn Vasylevskyi and Nicholas Chagnon*	

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill	Blue Mouse Boardroom	Emerald Ballroom 3
11:25 AM	Paper# 206 Full-Field Strain Patterns of Sandwich Beams of Different Length under Three-Point Bending *Fu-pen Chiang*, Lingtao Mao, Rui Guo and Austin Giordano*	Paper# 117 In-Plane Thermal Characterization of Fiberglass/Phenolic Honeycomb Core through an Experimental-Numerical Approach *Hooman Shahverdi*, Suresh Keshavanarayana, Aakash Kothare, Ping Teoh, Charles Yang and Allison Horner*	Paper# 203 Experimental Approach to Investigate Facesheet Delamination of Honeycomb Sandwich Panels under Ground-Air-Ground (GAG) Pressurization *Hrishikesh Pathak* and Mark E. Tuttle*		Paper# 127 Computational Study of Major Loop Hysteresis in Active Fiber Composites *Amir Sohrabi* and Anastasia Muliana*		Paper# 184 Investigation of Mode I Crack Growth of VARTM Carbon Composites using Optical Fibers *Daniel Drake*, Rani Sullivan, Kevin Brown and Stephen Clay*		
11:50 AM	**Luncheon Speaker: Design, manufacture and testing of an in-situ consolidated, out-of- autoclave, blended, integrated-stiffener, variable stiffness, thermoplastic composite wingbox** ***Dr. Paul Weaver*** ***Emerald Ballroom, 3rd floor***								
Parallel Sessions 11	11A	11B	11C	11D	11E	11F	11G	ASTM Committee D30	Posters + 10 minute Presentations
Track	O1: ONR Sponsored Session 5	S1: Sandwich Composites 2	E2: Environmental Effects	A3: Automotive Composites 2	M4: Multifunctional Composites 2	S4: Stochastic Modeling and Analysis of Composites 5	S5: Structural Health Monitering of Composite Structures 1		
1:15 PM	Paper# 68 1D-Patterned Nanocomposites Structured Using Oscillating Magnetic Fields *Namiko Yamamoto*, Mychal Spencer, Shreya Trivedi and Melissa Rudolph*	Paper# 106 Effects of Density and Cell Rise Ratio on 3D Failure Strengths of Rigid PVC Foam in different Loading Modes and Loading Directions *Akira Miyase*, King-Him Lo and Su-Su Wang*	Paper# 173 Finite Element Analysis of Moisture Diffusion into Sandwich Composite using Thermal-Mass Diffusion Analogy *Balakumaran Gopalarethinam* and Mark E. Tuttle*	Paper# 283 Improvements in the structural analysis of a composite material T-joint structure *Carlo Boursier Niutta*, Ermias Gebrekidan Koricho and Giovanni Belingardi*	Paper# 221 Effectively reduced damages with increased through-thickness electrical conductivity of CFRPs against artificial lighting strike *Vipin Kumar*, Tomohiro Yokozeki, Santwana Pati and Takao Okada*	Paper# 120 A Stochastic Structural Finite Element Model for Trabecular Bone and other Structural Foams *Saif Alrafeek*, James Jastifer and Peter Gustafson*	Paper# 232 Process and Health Monitoring of FRP by Rayleigh-Scattering Based Distribution Optical Fiber Sensors *Tatsuro Kosaka*, Yuki Handa and Kazuhiro Kusukawa*	1:00-1:30 PM ASTM Committee D30.03 Constituent/Precursor Properties	

Wednesday - continued

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill	Blue Mouse Boardroom	Emerald Ballroom 3
1:40 PM	Paper# 199	Paper# 142	Paper# 202	Paper# 299	Paper# 235	Paper# 162	Paper# 32	1:00-1:30 PM ASTM Committee D30.03 Constituent/ Precursor Properties	Poster Papers #24 & #28
	A Cohesive Zone Modeling Study on the Fracturing Behavior of Thermoset Polymer Nanocomposites *Yao Qiao* and Marco Salviato*	A methodology for the analysis of the initiation of inter-fiber failure and local delamination in wind turbine blade shell sandwich structures *Linqi Zhuang*, Luis Mailly, Lars Hedegaard and Yongxin Huang*	Coupled Diffusion/Large-Deformation Behavior of Epoxy Matrix Resin in Corrosive Environments *Jonathon Tanks*, Yoshihiko Arao and Masatoshi Kubouchi*	Crashworthiness analysis of short fiber reinforced composite bumper beam using multiscale modeling and FE Simulation *Ermias Koricho*, Giovanni Belingardi and Brunetto Martorana*	In-situ Damage Precursor Detection in Fiber Reinforced Composites using Mechanochemical Materials *Bonsung Koo*, Jack Miller, Ryan Gunckel, Aditi Chattopadhyay and Lenore Dai*	Defects Characterization, Damage Mapping, and Property Evaluation of Composites *Jim Lua*, Alireza Sadeghirad, Xiaodong Cui, Anand Karuppiah, Caleb Saathoff and Waruna Seneviratne*	Repeatability of Non-autonomous Self-Healing with Thermoplastic Healing Agent in Fiber Reinforced Thermoset Composite *Bodiuzzaman Jony, Mishal Thapa, Sameer Mulani* and Samit Roy*		#24-Fabrication of Lightweight Cu/Untwisted MWCNT Yarn Composite with High Current Capacity Value #28-Failure Prediction Using Viscoelastic/plastic Constitutive Equation Considering Entropy Damage for Polyimide
2:05 PM		Paper# 14	Paper# 231		Paper# 252	Paper# 182	Paper# 238	1:30-3:00 PM ASTM Committee D30.09 Sandwich Construction	Poster Papers #38 & #88
		Efficient manufacturing method of CFRP corrugation by using electro-activated deposition resin molding *Kazuaki Katagiri*, Shinya Honda, Shimpei Yamaguchi, Takuya Ehiro, Sonomi Kawakita, Hirosuke Sonomura, Tomoatsu Ozaki, Yayoi Yoshioka, Mamoru Takemura, Sayaka Minami and Katsuhiko Sasaki*	Erosion of Uni-Directional Carbon-Fiber Reinforced Polymer Composite - A Micromechanical Approach *Deliwala Ajaz Ahmed* and Yerramalli Chandra Sekher*		Additive Processing of Sacrificial Polymers to Enable Pressure Sensing in Structural Composites *Gyaneshwar Tandon*, Andrew Abbott, Thao Gibson and Jeffery Baur*	A Visco-hyperelastic Constitutive Model for Fiber-Reinforced Rubber Composites *Rui Li* and Dianyun Zhang*	3D Printed Continuous Fibre Composites: Exploiting Design Flexibility to Achieve Application Specific Properties *Mathew Joosten*, Matt Alizzi, Corben Wiles and Russell Varley*		#38-Evaluation of Giga-cycle Fatigue Characteristics of CFRP Cross-ply Laminates Using Ultrasonic Fatigue Testing #88-Multi-Scale Evaluation for Effect of Reinforcements on Viscoelasticity of Shape-Memory Polymer Composites

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill	Blue Mouse Boardroom	Emerald Ballroom 3
2:30 PM							Paper# 7 Temporal enhanced Ultrasound as a novel NDT technique for characterization of defects in composites *Navid Zobeiry*, Sharareh Bayat, Emran Anas, Parvin Mousavi, Purang Abolmaesumi and Anoush Poursartip*	1:30-3:00 PM ASTM Committee D30.09 Sandwich Construction	Poster Papers #93 & #108 #93-Thermoplastic Composites for Wind Turbine Blade Manufacturing #108-Effective Diameter of Added Glass Fiber into Matrix of Carbon Fiber Reinforced Thermo-Plastics for Improving Mechanical Properties
2:55 AM	***Networking Break - 4th floor foyer***								
Parallel Sessions 12	12A	12B	12C	12D	12E	12F	12G		
Track	C2: Composites in Extreme Environments	B3: Buckling and Post-Buckling of Composite Structure	M1: Micromechanics 4	A3: Automotive Composites 3	M4: Multifunctional Composites 3	B1: Bio-based Composites	S5: Structural Health Monitering of Composite Structures 2	ASTM Committee D30	Posters + 10 minute Presentations
3:10 PM	Paper# 37 Long-Term Durability of Unidirectional CFRP Subjected to Tensile Loading *Jun Koyanagi*, Saori Murata, Yasuyuki Kondo, Fumihiro Matsuda and Hironobu Yamashita*	Paper# 229 Optimal design of composite shells with multiple cutouts based on POD and machine learning methods *Kuo Tian*, Shiyao Lin, Jiaxin Zhang, Anthony M. Waas*	Paper# 52 Failure Mode Transition in Transverse Tensile of UD-CFRP Under Various Temperatures and Strain rates *Mio Sato*, Sakie Shirai, Jun Koyanagi and Yuichi Ishida*	Paper# 247 Designing Composite Leaf Spring with a Validated Finite Element Method *Abdullah Erdi Onut*, Semih Cakil, Yunus Emre Ozcelik, Mehmet Akif Unal and Sedef Cift Karagul*	Paper# 322 Damage and Delamination Modeling of Multifunctional Composite Structural Batteries *Daniel Perez* and Ryan Karkkainen*	Paper# 16 Impact damage behavior of basalt fibers composite laminates: comparison between vinyl ester and nylon 6 based systems *Pietro Russo*, Ilaria Papa and Valentina Lopresto*	Paper# 144 Damage Detection of Textile Composite Structures Using the Piezoelectric Impedance Method *Sazid Ahmed, Pei Cao, Dianyun Zhang* and Jiong Tang*	3:15-4:15 PM ASTM Committee D30.10 Composites for Civil Structures	Poster Papers #154 & #177 #154-Development study of Thin Aligned Carbon Nanotube Sheet Reinforced Poly(vinyl alcohol) Composites #177-Estimation of Physical Properties of Composite Materials by Data Assimilation and Multi-Objective Optimization of Heating Method

Wednesday - continued

Rooms	Seattle 1	Seattle 2	Seattle 3	Belltown	Pioneer	Capitol Hill	First Hill	Blue Mouse Boardroom	Emerald Ballroom 3
3:35 PM	Paper# 149 Temperature-dependent effective electrical conductivity of carbon nanotube–epoxy nanocomposites: A semi-analytical model *Antonio Avila* and Olesya Zhupanska*	Paper# 185 An Examination On The Applicability Of Compressive Buckling Allowable Design For Composite Panels And Analysis For Strength Calculations *Minoru Kobayashi**	Paper# 368 Micromechanics Model for Wavy CNT Nanocomposites with Weakened Interface *Feiyan Zhu and Gunjin Yun**	Paper# 349 Pull-out Strength of Fiberglass/Epoxy Composite Rebar Manufactured Using a Three-Dimensional Braiding Process *David Jensen* and Tari Machanzi*	Paper# 17 Nonlinear Aeroelastic Analysis of Composite Morphing Wing with Corrugated Structures *Natsuki Tsushima*, Tomohiro Yokozeki, Weihua Su and Hitoshi Arizono*	Paper# 140 Progressive Damage Analysis of a Bioresorbable Composite Subject to Three-Point Bending *Haotian Sun*, Bryant Heimbach, Mei Wei and Dianyun Zhang*	Paper# 233 Influence of Local Bending of Fresnel-Based Optical Fiber Sensors on Measuring Degree of Cure of FRP *Genko Fujioka*, Tatsuro Kosaka and Kazuhiro Kusukawa*	3:15-4:15 PM ASTM Committee D30.10 Composites for Civil Structures	Poster Papers #248 & #276 #248-Experimental and Analytical Studies on the Solvent Volatilization Behavior of Carbon Fiber/Phenylethynyl Terminated Polyimide Prepreg during Molding #276-Structural Adhesion of Thermoplastic Composites for Wind Turbine Blades
4:00 PM	Paper# 30 A coupled thermo-chemo-mechanical model for high temperature oxidations in polymers and polymer composites *Trisha Sain* and Shabnam Konica*	Paper# 205 An Investigation of Inner Flange Buckling in Furlable Composite Booms *Kevin Cox* and Kamron Medina*	Paper# 51 Rapid Generation of Representative Volume Elements with Non-uniformly Dispersed Reinforcements for High Volume Fraction Composites *John Montesano*, Geng Li, Farzad Sharifpour and Aram Bahmani*	Paper# 317 Buckling Stability of Additively Manufactured Isogrid *Sirija Ananth, Thomas Whitney* and Elias Toubia*	Paper# 273 Alignment of Nickel Coated Carbon Fibers by Magnetic Field during Cure of Polymer Composites *Maya Pishvar*, Mehrad Amirkhosravi and M. Cengiz Altan*	Paper# 111 Enhancing the Interface in Glass Fiber/Epoxy Composites with Nanocellulose *Ejaz Haque*, Joyanta Goswami, Robert Moon and Kyriaki Kalaitzidou*	Paper# 139 Analysis of damaged laminated composite plate under Dynamic and Aeroelastic Environment *Prasant Kumar Swain*, Dipak Kumar Maiti and Bhrigu Nath Singh*		Poster Papers #298 & 344 #298-Environmental Fatigue Properties of Graphene Nanocomposites #344-Investigation of Platelet Size Effect on Fracturing Behavior of Discontinuous Fiber Composite
4:25 PM	Paper# 141 Elevated-Temperature Thermal and Mechanical Behavior of Carbon Fiber/Graphite/PTFE/PEEK Composite *Shuren Qu* and Su-Su Wang*	Paper# 216 Finite Element Based Buckling Cross-Sectional Optimization for Composite Arrows *Anirudh Srinivas* and D.Stefan Dancila*	Paper# 195 Damping Properties of Polymer Lattice Materials *Lisa Dangora**		Paper# 345 Development of robust electrically Insulated carbon nanotube yarns for sensing in conductive composites *Jude Anike*, Binita Saha and Jandro Abot*	Paper# 222 Advanced Manufacturing of Mycological Bio-Based Composites *Sonia Travaglini* and CKH Dharan*			

Wednesday Poster Titles and Authors

1:40-4:25 PM, Emerald Ballroom 3
Posters + 10 minute Presentations
Paper# 24, Fabrication of Lightweight Cu/Untwisted MWCNT Yarn Composite with High Current Capacity Value
Yuta Hoshi, Kotaro Kajihara, Tae Sung Kim, Atsushi Hosoi And Hiroyuki Kawada
Paper# 28, Failure Prediction Using Viscoelastic/plastic Constitutive Equation Considering Entropy Damage for Polyimide
Mao Hososhima, Hiroki Kuramochi, Jun Koyanagi and Yuichi Ishida
Paper# 38, Evaluation of Giga-cycle Fatigue Characteristics of CFRP Cross-ply Laminates Using Ultrasonic Fatigue Testing
Takuro Suzuki, Atsushi Hosoi, Yoshinobu Shimamura and Hiroyuki Kawada
Paper# 88, Multi-Scale Evaluation for Effect of Reinforcements on Viscoelasticity of Shape-Memory Polymer Composites
Yuta Naito, Shimpei Matsuda, Masaaki Nishikawa, Naoki Matsuda and Masaki Hojo
Paper# 93, Thermoplastic Composites for Wind Turbine Blade Manufacturing
Dylan Cousins, Yasuhito Suzuki, Joseph Samaniuk and Aaron Stebner
Paper# 108, Effective Diameter of Added Glass Fiber into Matrix of Carbon Fiber Reinforced Thermo-Plastics for Improving Mechanical Properties
Naoto Miyakita, Kazuya Okubo, Kiyataka Obunai and Kazuya Yanagita
Paper# 154, Development study of Thin Aligned Carbon Nanotube Sheet Reinforced Poly(vinyl alcohol) Composites
Tomoki Ohsato, Ken Goto, Tran Huu Nam, Yoshinobu Shimamura, Yoku Inoue and Tomonaga Ueno
Paper# 177, Estimation of Physical Properties of Composite Materials by Data Assimilation and Multi-Objective Optimization of Heating Method
Ryota Yokoyama and Ryousuke Matuzaki
Paper# 248, Experimental and Analytical Studies on the Solvent Volatilization Behavior of Carbon Fiber/Phenylethynyl Terminated Polyimide Prepreg during Molding
Miho Yamanaka, Shintaro Kamiyama, Toshio Ogasawara and Yuichi Ishida
Paper# 276, Structural Adhesion of Thermoplastic Composites for Wind Turbine Blades
Peter Caltagirone
Paper# 298, Environmental Fatigue Properties of Graphene Nanocomposites
Yao Qiao, Jennifer Garner and Marco Salviato
Paper# 344, Investigation of Platelet Size Effect on Fracturing Behavior of Discontinuous Fiber Composite
Kenrick Chan and Minh Nguyen
Posters Only (No Oral Presentation)
Damage Detection on Composite Plates Using Fiber Bragg Grating and Piezoelectric Ultrasonic Sensors
Ciera McFarland, Junghyun Wee, and Kara Peters
Characterization of Freeze-Thaw Cycling Induced Damage in Aircraft Composites using Relative Permittivity
Matthew Urrea, Ogheneovo Idolor, Rishabh Guha, and Landon Grace
Characterizing Light Transmission Through Fractured Fiber Optic Waveguides
Tyler Anderson, Kara Peters, and Jason Patrick

Thursday September 27, 2018

Room	Belltown
8:00 AM	D30.05 Structural Test Methods
9:00 AM	D30.01 Editorial and Resource Standards
10:30 AM	D30.02 Research and Mechanics & D14.80 on Metal Bonding Adhesives
11:30 AM	D30 Main Committee

Notes

MOTIF VENUE MAP