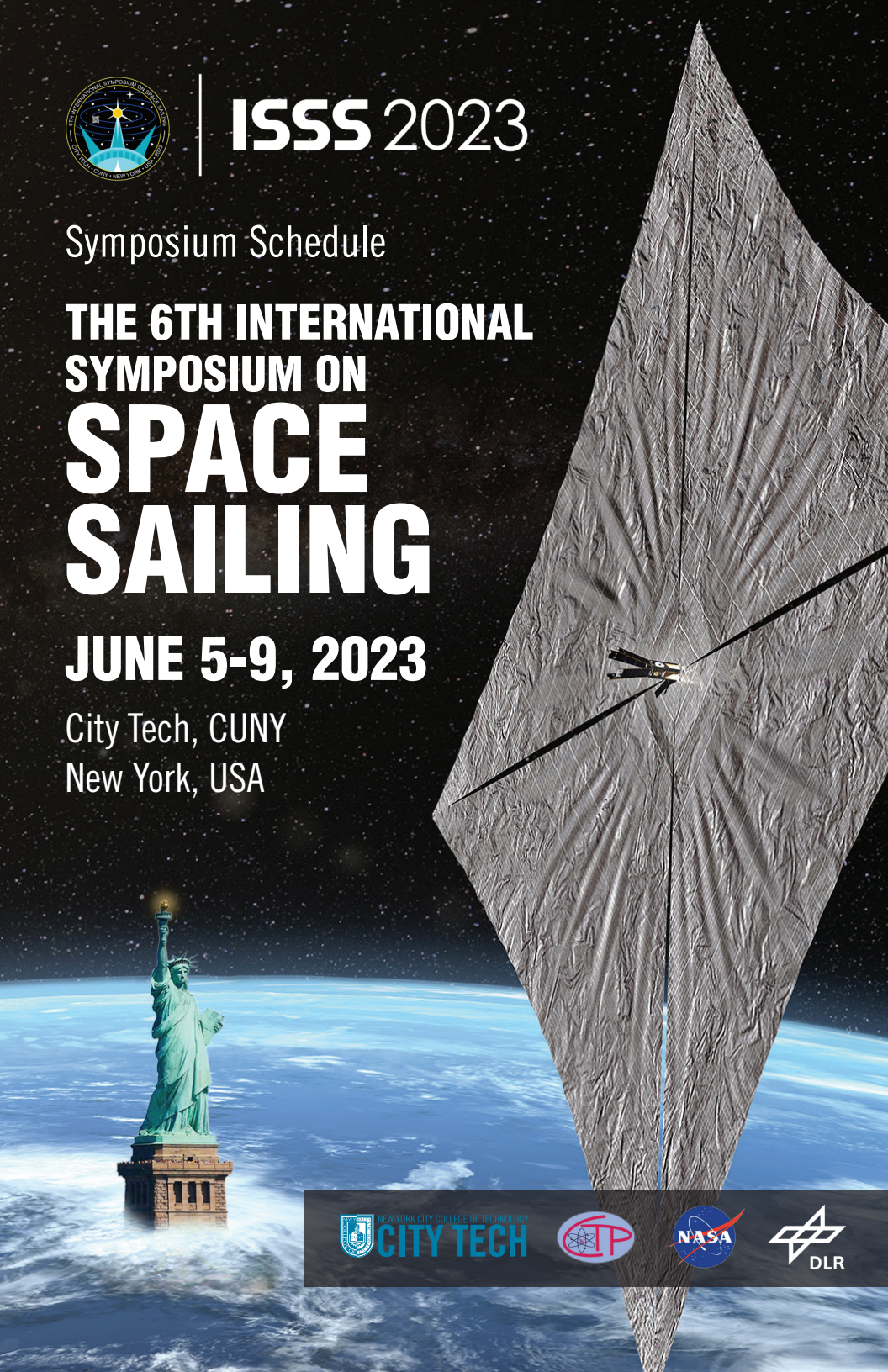
ISSS 2023

Symposium Schedule

THE 6TH INTERNATIONAL SYMPOSIUM ON SPACE SAILING

JUNE 5-9, 2023

City Tech, CUNY
New York, USA



NEW YORK CITY COLLEGE OF TECHNOLOGY CITY TECH

NASA

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New York City College of Technology
City University of New York, USA

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University of Glasgow, United Kingdom

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The Planetary Society, USA

Dr. Patric Seefeldt
DLR, Germany

Prof. Olga Starinova
Samara Research University, Russia

Prof. Bong Wie
Iowa State University, USA

Dr. Xiangyuan Zeng
Beijing Institute of Technology, China

For each talk is allocated 25 minutes and 5 minutes for questions and discussion

Symposium Schedule

June 5, Monday

8:00 am – 9:45 am Registration		
Chair: Roman Kezerashvili		
9:45 am Welcome Remarks		
10:00 – 10:30 am	*Pekka Janhunen*	Coulomb Drag Propulsion
10:30 – 11:00 am	*Osamu Mori, Masanori Matsushita, Ahmed Kiyoshi Sugihara, Yuki Takao, Toshihiro Chujo, Yasuyuki Miyazaki, Yasutaka Satou, Nobukatsu Okuizumi, Hiraku Sakamoto, Ryu Funase, Naoya Ozaki, Yuki Kubo, Akihito Watanabe*	New Solar Power Sail Program in the Post-OKEANOS Era
11:00 - 11:30 am Coffee Break		
Chair: Bernd Dachwald		
11:30 am –12:00	*Les Johnson, Carlos Diaz, Leslie McNutt, Danny Tyler, Darren Wallace, Jeff Wilson*	The NASA Solar Cruiser Solar Sail System – Ready for Heliophysics and Deep Space Missions
12:00 – 12:30 pm	*W. Keats Wilkie*	Advanced Composite Solar Sail System Mission Update
12:30 –1:00 pm	*Piotr Fil, Gil Barbosa Ribeiro, Debdut Sengupta, Beatriz Soriano Tortosa*	Research for and Early-Stage Development of the First Interstellar CubeSat Powered by Solar Sailing Technology
1:00 – 2:00 pm Lunch		
Chair: Juan Fernandez		
2:00 – 2:30 pm	*Bruce H. Betts, John M. Bellardo, Justin R. Mansell, Barbara Plante, David A. Spencer*	LightSail 2 Image-Based Engineering Assessment
2:30 –3:00 pm	*Justin R. Mansell, John M. Bellardo, Bruce H. Betts, Barbara Plante, David A. Spencer.*	LightSail 2 Orbit Evolution and Attitude Control Performance
3:00 – 3:30 pm	*Andrew Nutter, Constantin Bauda, Jordan Culeux, Marco Straubel, Martin E. Zander, Martin Hillebrandt*	Objectives, Design and Initial Test Results of the Upcoming GAMA-β Solar Sail In-Orbit Demonstration
Coffee Break 3:00- 3:30 pm		
Chair: Iain Moore		
3:30 – 4:00 pm	*Andrew Heaton*	Near Earth Asteroid Scout Solar Sail Mission Overview
4:30 – 5:00 pm	*Andres Dono, Ted Hendriks, Keats Wilkie*	ACS3 – Flight Dynamics for a Solar Sail Technology Demonstration Mission
6:30 – 9 pm Reception		

June 6, Tuesday

Chair: Matteo Ceriotti		
9:00 – 9:30 am	*Giovanni Vulpetti, Christian Circi, Rocco Pellegrini, Enrico Cavallini*	Sailcraft Helianthus: a Solar-Photon Sail for Geostorm Early Warning
9:30 – 10:00 am	*Yuki Takao, Osamu Mori, Masanori Matsushita, Kazutaka Nishiyama, Ryudo Tsukizaki, Kuniyoshi Tabata, Naoya Ozaki, Yuki Kubo, Ryu Funase*	A Rendezvous Mission to Outer Solar System Bodies Using a 100-kg-class Solar Power Sail
10:00 – 10:30 am	*Gregory L. Maloff, Les Johnson*	Breakthrough Sun Diving: The Rectilinear Option
10:30 – 11: 00 am	*Iain Moore, Onur Çelik, Temitayo Oderinwale, Litesh Sulbhewar, Colin R. McInnes*	SOLSPACE Solar Reflectors: Commonalities with Solar Sailing
11:00 - 11:30 am Coffee Break		
Chair: Les Johnson		
11: 30 am – 12:00	*Juan Fernandez*	Scalability of Solar Sail Designs using Deployable Thin-Shell Composite Booms
12:00 – 12:30 pm	*Marco Straubel, Martin Hillebrandt, Martin E. Zander*	Modular and Scalable Boom Deployment Mechanism for Deployment and Retraction of up to four CTMs
12:30 – 1:00 pm	*Roman Kezerashvili, Vladimir Kezerashvili*	Ways to Deploy a Large Size Solar Sail
1:00 – 2:00 pm Lunch		
Chair: Bruce Betts		
2:00 – 2:30 pm	*Zachary McConnel, Brian Sanders, Anan Takoori, Jim Pearson, Carlos Diaz, Ashley Benson*	Test of a Full-Scale Quadrant for the 1,653 m^2 Solar Cruiser Sail
2:30 – 3:00 pm	*James C. Pearson, Jr. , Kirk Maddox, Mark Johnson, Seth A. Gipson, Les Johnson, Leslie McNutt*	Development of a Flight-Like Solar Sail Quadrant for NASA's Solar Cruiser
3:00 – 3:30 pm	*Andrew Heaton, Saba Ramathani, Daniel Tyler*	Reflectivity Control Device Roll Momentum Management for Solar Cruiser and Beyond
3:30- 4:00 pm Coffee Break		
Chair: Livio Carzana		
4:00 – 4:30 pm	*John Inness, Daniel Tyler, Benjamin Diedrich, Saba Ramazani, Juan Orphee*	Momentum Management Strategies for Solar Cruiser and Beyond
4:30 – 5:00 pm	*Amber Dubill, Grover Swartzlander, Les Johnson*	Next in Solar Sail Technology: Diffractive Solar Sailing

June 7, Wednesday

Chair: Greg Matloff		
9:00 – 9-30 am	*Bernd Dachwald, Frederic Schoutetens, Jeannette Heiligers*	Optimal Capture of an Interstellar High-Velocity Photon Sail in the Alpha Centauri System
9:30 – 10:00 am	*Elena Ancona, Roman Kezerashvili*	Mission to Sedna with a Solar Sail Exploiting Thermal Desorption of Coatings
10:00 – 10:30 am	*Tim Rotmans*	Photon-sail Trajectories to Exoplanet Proxima b Using Heteroclinic Connections
10:30 – 11: 00 am	*Olga L. Starinova, Miroslav A. Rozhkov, Bakhyt Alipova*	Long-term Mission of The Spacecraft with a Degrading Solar Sail into the Asteroid Belt
11:00 - 11:30 am Coffee Break		
Chair: Grover Swartzlander		
11: 30 am – 12:00	*Matteo Ceriotti, Giulia Viavattene, Andrea Caruso, Giovanni Mengali, Alessandro Quarta*	Advances in Preliminary Solar-Sail Trajectory Design
12: 00 – 12:30 pm	*Alesia Herasimenka, Lamberto Dell'Elce, Jean-Baptiste Caillau, Jean-Baptiste Pomet*	Controllability of Solar Sails
12:30 – 1:00 pm	*Christian Bianchi, Lorenzo Niccolai, Giovanni Mengali, Matteo Ceriotti*	Blended Locally-optimal Control Laws for Space Debris Removal in LEO Using a Solar Sail
1:00 – 2:00 pm Lunch		

Chair: Keats Wilkie		
2:00 – 2:30 pm	*Livio Carzana, W. Keats Wilkie, Andrew Heaton, Ben Diedrich, Jeannette Heiligers*	Solar-sail Steering Laws to Calibrate the Accelerations from Solar Radiation Pressure, Planetary Radiation Pressure, and Aerodynamic Drag
2:30 – 3:00 pm	*Benjamin Gauvain, Daniel Tyler*	A Solar Sail Shape Modeling Approach for Attitude Control Design and Analysis
3:00 – 3:30 pm Coffee Break		
Chair: Christian Bianchi		
3:30 – 4:00 pm	*Grover A. Swartzlander, Prateek R. Srivastava, Ryan M. Crum, Qing Wang, Aaron M. Becker, Amber L. Dubill, Joseph A. Miragliotta, David B. Shrekenhamer, Christine M. Zgrabik, David E. Roberts, Anna M. Tabirian, Les Johnson, Andy Heaton*	A Comparison of Diffractive Films for Solar Sailing
4:00 – 4:30 pm	*Hanseong Jo, Tom Joly-Jehenne, Evy Haynes, Ho-Ting Tung, Artur Davoyan*	Advanced Approaches to Solar Sailing
Poster Session		
Tommaso Casati, Bernd Dachwald, Joe Zender, Anna Milillo, Francesco Topputo		Trajectory Design for a Solar Sail Mercury Impactor
Jan Thimo Grundmann, Laura Borella, Ross Centers, Matteo Ceriotti, Suditi Chand, Bernd Dachwald, Sebastian Fexer, Christian D. Grimm, Matthias Grott, Jeffrey Hendrikse, David Herčík, Alain Hérique, Tra-Mi Ho, Robert G. Kennedy III, Christian Krause, Caroline Lange, Roy Lichtenheldt, Iain Moore, Ivanka Pelivan, Dirk Plettemeier, Dominik Quantius, Patric Seefeldt, Fabienne Seibert		Bridging the Gaps between the CubeSat Trend, Sailcraft-specific Requirements, Complex Deployment Tasks, and Interplanetary Space
Amirul Fiqri Abdullah, Bernd Dachwald, Yew-Chung Chak, Koju Hiraki, Letícia Barros, Renuganth Varatharajoo		Global Trajectory Optimization for Solar-Sail Propelled Mercury Rendezvous and Impact Missions

June 8, Thursday

Chair: Lorenzo Niccolai		
9:00 – 9-30 am	*Miroslav A. Rozhkov, Olga L. Starinova*	Cyclic Interplanetary Motion of a Cargo Solar Sail
9:30 – 10:00 am	*Benjamin Diedrich*	Solar Sail Torque Model Characterization for the Near-Earth Asteroid Scout Mission
10:00 – 10:30 am	*Tom Sproewitz, Patric Seefeldt, Siebo Reershemius, Nicolas Woods, Marta Tokarz, Jerzy Grygorczuk, Piotr Torchala, Dominik Nolbert, Tim Kubera*	Highly Efficient Membrane-based Photovoltaic Array for Solar Sailing Missions
10:30 – 11: 00 am	*Ryan J. Caverly, Keegan Bunker, Nathan Raab, Vinh L. Nguyen, Garvin Saner, Zixin Chen, Tyler Douvier, Richard J. Lyman, Owen Sorby, Benjamin Sorge, Ebise Teshale, Benjamin Toriseva*	Solar Sail Attitude Control Using Shape Modulation: The Cable-Actuated Bio-inspired Lightweight Elastic Solar Sail Concept
Coffee Break 11:00 - 11:30 am		
Chair: Janhunen Pekka		
11:30 am – 12:00	*Les Johnson, Jeannette Heiligers, Dana Turse, Patric Seefeldt, Bernd Dachwald, Ross Centers, Claudia Wieners, Behnam Taebi, Ben Kravitz, Jan Thimo Grundmann*	Planetary Sunshades for Solar Radiation Management: A Noninvasive, Feasible, and Affordable Climate Emergency Insurance Option
12:00 – 12:30 pm	*Livio Carzana, Pieter Visser, Jeannette Heiligers*	A New Model for the Planetary Radiation Pressure Acceleration for Optical Solar Sails
12:30 – 1:00 pm	*Bruce Campbell*	Factoring Force Uncertainty into Solar Sail Mission Planning
1:00 – 2:00 pm Lunch		

Chair: Yuki Takao		
2:00 – 2:30 pm	*Jin Ho Kang, Keith Gordon, Robert Bryant, W. Keats Wilkie, Kim de Groh, Olive Stohlman, Juan Fernandez, Jerry Warren, Gregory Dean, Nigel Schneider, Todd Denkins, Stark Amanda, Phillip Brown, Matthew Chamberlain*	Space Environmental Damage Assessment on Sail/ Deorbit Materials in Low Earth Orbit
2:30 – 3:00 pm	*Erik M. Klein, Patric Seefeldt, Maciej Sznajder*	Solar Sail Propulsion Limitations Due to Hydrogen Blistering: Progression of Reflectance Decrease
3:00-3:30 pm	*Ilhan Tuzcu*	A Reduced-Order Model for the Dynamics of a Flexible Solar Sail
3:30 - 4:00 pm Coffee Break		
Chair: Alesia Herasimenka		
4:00 – 4:30 pm	*Zitong Lin, Matteo Ceriotti, Colin McInnes*	Adaptive Terminal Sliding Mode Control for Asteroid Hovering by Solar Sailing: Application to 433 Eros
4:30 – 5:00 pm	*Joshua Umansky-Castro, Corbin Heywood*	Development of Gram-Scale Flight Computers for Free-Flying Light Sail Demonstration in LEO
7:00 – 9:00 pm **Symposium Banquet**		

June 9, Friday

Chair: Patric Seefeldt		
9:00 – 9-30 am	*Yuki Takao, Osamu Mori, Shota Kikuchi, Yusuke Oki, Ahmed Kiyoshi Sugihara, Tetsuya Kusumoto*	Constellation Around Small Bodies Using Spinning Solar Sails Under Simultaneous Orbit-Attitude-Structure Control
9:30 – 10:00 am	*Juan Garcia-Bonilla, Livio Carzana, Jeannette Heiligers*	Uncertainty quantification for solar sails in the near-Earth environment
10:00 – 10:30 am	*Daniel Stelzl, Patric Seefeldt, Matthias Killian, Leonard Hofmann, German Puttich, Xenia Lopez-Corralez, Carlos Garcia Mora, Jannik Pimpi, Manuel Schuhbaur, Olaf Stolz, Peter Lindenmaier, Tom Spröwitz, Tiziana Cardone, Ernst K. Pfeiffer*	The ADEO Space Sail Products
Coffee Break 10:30 –11:00 am		
Chair: Roman Kezerashvili		
11: 00 am – 11:30	*Gyula Greschik*	A New Tethered Sail Architecture: the Solar Kite
11:30 am – 12:00	*Gregor MacAskill, Nektarios Chari, Joe Gibbs, Matteo Ceriotti*	Design and Analysis of a Quasi-Rhombic Pyramid Drag Sail for Passive Attitude Control and De-Orbit of OirthirSAT
12:00 – 12:30 pm	*Lorenzo Niccolai*	Optimal Deep-Space Heliocentric Transfers with An Electric Sail and an Electric Thruster
12:30 – 1:00 pm Panel Discussion Symposium Closing		