



The 19th International Conference on DNA Computing and Molecular Programming

September 22, 2013 – September 27, 2013

Lectures

Sunday, September 22, 2013: Tutorial Day at ISTB4
Monday, September 23, 2013: DNA19 at Old Main
Tuesday, September 24, 2013: DNA19 at Old Main
Wednesday, September 25, 2013: DNA19 at Old Main
Thursday, September 26, 2013: DNA19 at Old Main
Friday, September 27, 2013: Nanoday 2013 at Old Main

ISTB4

781 E Terrace Rd
Tempe, AZ 85287

Old Main

400 E Tyler Mall
Tempe, AZ 85281

Posters

Monday at Old Main: Groups I and II present
Tuesday at Old Main: Groups II and III present
Wednesday at Old Main: Groups I and III present

PROGRAM

Sunday, September 22: Tutorial Day at ISTB4		
Start Time	Activity	Chair
12:00 PM	Registration/Check-in	
12:30 PM	Tutorial #1 - Kurt Gothelf <i>Structural Design Aspects of DNA Nanotechnology</i>	Hao Yan
2:00 PM	Break - Refreshments	
2:15 PM	Tutorial #2 - Fritz Simmel <i>Experimental Aspects of Biomolecular Nanodevices and Circuits</i>	
3:45 PM	Break - Coffee	
4:00 PM	Tutorial #3 - Andrew Phillips <i>Modelling, Simulating and Analysing DNA Strand Displacement Circuits</i>	
5:30 PM	Dinner on Your Own	

Monday, September 23: DNA19 at Old Main		
Start Time	Activity	Chair
8:00 AM	Registration/Badge Pick-up	
9:00 AM	Opening Remarks - Hao Yan	
9:15 AM	Plenary Presentation 1 - Eric Goles <i>Threshold Networks: Dynamics and Complexity</i>	Natasha Jonoska
10:15 AM	Break - Refreshments	
10:45 AM	David Doty and Monir Hajiaghayi <i>Leaderless Deterministic Chemical Reaction Networks</i>	David Soloveichik
11:15 AM	Andrew Winslow <i>Staged Self-Assembly and Polyomino Context-Free Grammars</i>	
11:45 AM	Dandan Mo and Darko Stefanovic: <i>Iterative Self-Assembly with Dynamic Strength Transformation and Temperature Control</i>	
12:15 PM	Lunch at The University Club	
1:45 PM	Lila Kari, Steffen Kopecki and Shinnosuke Seki <i>3-Color Bounded Patterned Self-Assembly</i>	Lulu Qian
2:15 PM	Mark Arnold <i>Extending DNA-Sticker Arithmetic to Arbitrary Size Using Staples</i>	
2:45 PM	Jennifer Padilla, Junghuei Chen, Natasha Jonoska and Nadrian Seeman <i>Self Assembly by Signal Transmission</i>	
3:15 PM	Break - Coffee	
3:45 PM	Alexandra Keenan, Xingsi Zhong and Robert Schweller <i>Exponential Replication of Patterns in the Signal Tile Assembly Model</i>	Fritz Simmel
4:15 PM	Matthew Patitz, Trent Rogers, Jennifer Padilla and Jacob Hendricks <i>Signal Transmission Across Tile Assemblies: 3D Static Tiles Simulate Active Self-Assembly by 2D Signal-Passing Tiles</i>	
4:45 PM	Group Photo at Old Main	
5:00 PM	Poster Session (refreshments) - Groups I and II	
6:30 PM	Dinner on Your Own	

Tuesday, September 24: DNA19 at Old Main		
Start Time	Activity	Chair
9:00 AM	Plenary Presentation 2 - Lulu Qian <i>Robust and Systematic Molecular Engineering with Synthetic Nucleic-Acid Strand Displacement Circuits</i>	Anne Condon
10:00 AM	Constantine Evans and Erik Winfree <i>DNA Sticky End Design and Assignment for Robust Algorithmic Self-Assembly</i>	
10:30 AM	Break - Refreshments	
11:00 AM	Niranjan Srinivas, Thomas Ouldridge, Petr Sulc, Joseph Schaeffer, Ard Louis, Jonathan Doye and Erik Winfree: <i>On the Biophysics and Kinetics of Toehold-Mediated DNA Strand Displacement</i>	Niles Pierce
11:30 AM	Matthew R. Lakin, Darko Stefanovic and Andrew Phillips: <i>Modular Verification of Two-Domain DNA Strand Displacement Networks via Serializability Analysis</i>	
12:00 PM	Boyan Yordanov, Christoph M. Wintersteiger, Youssef Hamadi, Andrew Phillips and Hillel Kugler: <i>Functional Analysis of Large-Scale DNA Strand Displacement Circuits</i>	
12:30 PM	Lunch on Your Own (DNA19 Steering Committee Meeting at the U Club)	
2:00 PM	Plenary Presentation 3 - Alessandra Carbone <i>Coding of Evolutionary Pathways in Proteins: From Sequence to Function</i>	Ned Seeman
3:00 PM	Moya Chen, Doris Xin and Damien Woods <i>Parallel Computation using Active Self-Assembly</i>	
3:30 PM	Break - Coffee	
4:00 PM	Jongmin Kim, Ishan Khetarpal, Shaunak Sen and Richard Murray <i>Synthetic Circuit for Exact Adaptation and Fold-Change Detection</i>	Yannick Rondelez
4:30 PM	Gourab Chatterjee, Richard Muscat, Karin Strauss, Luis Ceze and Georg Seelig <i>DNA Circuit Boards For Molecular Computation</i>	
5:00 PM	Poster Session (refreshments) - Groups II and III	
6:30 PM	Dinner on Your Own	

Wednesday, September 25: DNA19 at Old Main		
Start Time	Activity	Chair
9:00 AM	Plenary Presentation 4 - Hendrik Dietz <i>Function Follows Form by DNA</i>	Chengde Mao
10:00 AM	Alireza Goudarzi, Matthew R. Lakin and Darko Stefanovic <i>DNA Reservoir Computing: A Novel Molecular Computing Approach</i>	
10:30 AM	Break - Refreshments	
11:00 AM	Ralf Jungmann, Maier Avendano, Johannes Woehrstein, Mingjie Dai, William M. Shih and Peng Yin: <i>Multiplexed Cellular 3D Super-Resolution Imaging with DNA-PAINT</i>	Tim Liedl
11:30 AM	Mohammad Mottaghi and Chris Dwyer: <i>More Visible Features per Sample in Fluorescence Microscopy by Polychromatic Address Multiplexing</i>	
12:00 PM	Carl W. Brown Iii, Matthew R. Lakin, Hannah E. West, Darko Stefanovic and Steven W. Graves: <i>Modular Signal Propagation Between DNA Logic Architectures</i>	
12:30 PM	Box Lunch at Old Main (Steering Committee Meeting at U Club)	
2:00 PM	Plenary Presentation 5 - Chengde Mao <i>Self-Assembly of DNA Nanocages</i>	Kurt Gothelf
3:00 PM	Yonggang Ke, Luvena Ong, Wei Sun, William Shih and Peng Yin <i>Three-Dimensional Discrete DNA structures and DNA Crystals Self-Assembled from DNA Bricks</i>	
3:30 PM	Break - Coffee	
4:00 PM	John Sadowski, Colby Calvert, David Zhang, Niles Pierce and Peng Yin <i>Developmental Self-Assembly of a DNA Tetrahedron</i>	William Shih
4:30 PM	Peter Allen and Andrew Ellington <i>3D Printing of DNA-Assembled Microspheres into Objects</i>	
5:00 PM	Poster Session (refreshments) - Groups I and III	
6:30 PM	Dinner on Your Own	

Thursday, September 26: DNA19 at Old Main		
Start Time	Activity	Chair
9:00 AM	Plenary Presentation #6 - Yannick Rondelez <i>Molecular Programming with the DNA Toolbox</i>	Erik Winfree
10:00 AM	Lisa Hochrein, Ma'Ayan Schwarzkopf, Peng Yin and Niles Pierce: <i>Engineering Diverse Nucleic Acid Mechanisms for Conditional Dicer Substrate Formation</i>	
10:30 AM	Break - Refreshments	
11:00 AM	Iñaki Sainz de Murieta and Alfonso Rodríguez-Patón <i>Probabilistic Reasoning with an Enzyme-Driven DNA Device</i>	Masami Hagiya
11:30 AM	Frits Dannenberg, Marta Kwiatkowska, Chris Thachuk and Andrew Turberfield: <i>DNA Walker Circuits: Computational Potential, Design, and Verification</i>	
12:00 PM	Adrien Padirac, Jean-Christophe Galas, Anton Zadorin, Adithya Kalley, Yannick Rondelez and Andre Estevez-Torres: <i>DNA Molecular Programming Goes Spatial</i>	
12:30 PM	Lunch on Your Own (ISNSCE Meeting)	
2:00 PM	Fei Zhang, Yan Liu and Hao Yan <i>Complex Archimedean Tiling Self-Assembled from DNA Nanostructures</i>	Peng Yin
2:30 PM	John Milligan, Yu Jiang, Bingling Li, Sanchita Bhadra and Andrew Ellington <i>Real-time Detection of Isothermal Amplification Reactions with Thermostable Catalytic Hairpin Assembly</i>	
3:00 PM	Buses to Desert Botanical Garden - Pickup at Old Main*	
3:30 PM	Tours of Desert Botanical Garden	
4:00 PM	Ongoing Tours and Cocktails	
5:30 PM	Banquet Dinner	
6:45 PM	DNA19 General Assembly	
8:30 PM	Buses Return to ASU Campus - Drop-off at Old Main	

*The last presentation on Thursday, September 26th will end at 3:00 pm. At that time DNA19 conference attendees will walk as a group to a nearby location where three charter buses will transport you to the Desert Botanical Garden: 1201 N. Galvin Parkway, Phoenix, AZ 85008.

The pickup location is the NE corner of 7th Street and College Ave. Walk down the stairs on the North side of Old Main and down to the path that leads to University Ave. Cross the street at the light and continue walking down College Ave until you reach the NE corner of 7th Street and College Ave. The buses will not leave the pickup site until around 3:20 pm. After the banquet, at approximately 8:30 pm the buses will return conference attendees to the same location.

Friday, September 27: Nanoday 2013 at Old Main		
Start Time	Activity	Chair
8:30 AM	Ned Seeman <i>Controlling the Structure of Matter on the Nanoscale Using the Information in DNA</i>	Hanadi Sleiman
9:15 AM	Fritz Simmel <i>DNA Surfaces, Soap, and Bubbles</i>	
10:00 AM	John Spence <i>X-Ray Lasers for Structural and Dynamic Biology</i>	
10:45 AM	Break - Refreshments	
11:15 AM	Kurt Gothelf <i>DNA-Programmed Assembly of Molecules and Materials</i>	Dongsheng Liu
12:00 PM	Tim Liedl <i>Nanophotonics Enabled by DNA Origami</i>	
12:45 PM	Box Lunch at Old Main	
1:45 PM	William Shih <i>DNA Nanostructures as Building Blocks for Molecular Biophysics and Future Therapeutics</i>	Yan Liu
2:30 PM	John Chaput <i>Encoding Information in Artificial Genetic Polymers</i>	
3:15 PM	Break - Coffee	
3:45 PM	Hanadi Sleiman <i>Interfacing DNA Structures with Molecules and Polymers for Biological Applications</i>	Hao Yan
4:30 PM	Peng Yin <i>Programming Nucleic Acids Self-Assembly</i>	
5:15 PM	Dongsheng Liu <i>Frame Guided Assembly of Vesicles with Programmed Geometry and Dimension</i>	
6:00 PM	Closing Remarks - Hao Yan	
6:15 PM	Dinner on Your Own	

Thanks for your attention and participation!

Poster Group, Title, and Author(s)

Group	Title	Author(s)
1	Coarse-grained modelling of DNA hybridization	Petr Sulc, Thomas Ouldridge, Flavio Romano, Jonathan Doye and Ard Louis
	Timing in chemical reaction networks	David Doty
	Kinetic Digraph Rewrite Systems: Coarse-Grained Models for Dynamic DNA Nanodevices	Reem Mokhtar, Hieu Bui, Harish Chandran, Sudhanshu Garg, Tianqi Song and John Reif
	Complexity and Computability of Temperature-1 Tilings	John Reif and Tianqi Song
	Approaching Mathematical Model of the Immune Network based DNA Strand Displacement System	Rizki Mardian, Kosuke Sekiyama and Toshio Fukuda
	The expressive power of the DNA query language DNAQL	Robert Brijder, Joris Gillis and Jan Van Den Bussche
	BioEthernet: Toward Distributed Packet Switching for Local Cellular Networks	Elmirasadat Forouzmand, Narjes S. Movahedi and Hamidreza Chitsaz
	Percolating Properties of Tile Assembly	Tyler Moore, Max Garzon and Russell Deaton
	One-Time, Directed and Catalytic Activation of 1-D DNA Tiles	Sudhanshu Garg, Harish Chandran, Nikhil Gopalkrishnan and John Reif
	Complex Dynamics in Random DNA Strand Circuits	Peter Banda and Christof Teuscher
	Computing Minimum Tile Sets to self-Assemble Patterns in 29 Colors	Aleck Johnsen, Ming-Yang Kao and Shinnosuke Seki
	Towards Persistent Molecular Computers for Molecular Robots	Masami Hagiya, Ibuki Kawamata and Nathanael Aubert
	Tiling Simulation of Directed Percolation	Tyler Moore, Russell Deaton and Max Garzon
	Off-lattice Modeling of DNA Nanostructure Shape and Flexibility	Keyao Pan, Do-Nyun Kim and Mark Bathe
	Coarse-grained modelling of DNA tile structure and assembly	Matthew Adendorff and Mark Bathe
	Temperature 1 Simulation of Temperature 2 aTAM Systems using Active Tiles	Natasha Jonoska and Daria Karpenko
	A Computer Assisted Design Tool for Dynamic DNA Computation Systems	Nathanael Aubert, Teruo Fujii, Masami Hagiya and Yannick Rondelez
	Coarse-grained simulation model for molecular robot design	Shinnosuke Tsutsui
	Molecular Computational Simulation of Cognitive Processes for Anagram Solving	Ji-Hoon Lee, Eun Seok Lee, Je-Hwan Ryu, Hyo-Sun Chun and Byoung-Tak Zhang
	Automatic characterization of the kinetics and error modes of DNA strand displacement networks using Visual DSD	Neil Dalchau, Rasmus Petersen, Yuan-Jyue Chen, Georg Seelig and Andrew Phillips
	DNA Domino Toppling: Speeding Up DNA Logic Circuits by Localizing Reaction --- Simulation Study --	Satoshi Kobayashi and Ryohei Nagasawa
	Integrated Encoding of Semantic and Orthographic Distances in a DNA Language Model	Je-Hwan Ryu, Ji-Hoon Lee and Byoung-Tak Zhang
	Configuration Replication in Active Self-Assembly	David Chavez, Robert Schweller, Xingsi Zhong and Ramses Reyes
	Fast Arithmetic in Algorithmic Self-Assembly	Alexandra Keenan, Robert Schweller, Michael Sherman and Xingsi Zhong
Sublinear Sorting In The 3-Dimensional Abstract Tile Assembly Model	Xingsi Zhong, Robert Schweller and Michael Sherman	
Intrinsic universality in self-assembly requires cooperation: Temperature 1 self-assembly is weaker than temperature 2	Pierre-Etienne Meunier, Matthew Patitz, Scott Summers, Guillaume Theyssier, Andrew Winslow and Damien Woods	

Group	Title	Author(s)
II	Hybridization Kinetics of Multivalent DNA Tiles	Shuoxing Jiang, Dongran Han, Hao Yan and Yan Liu
	Design space for complex DNA structures	Bryan Wei, Mingjie Dai, Cameron Myhrvold, Yonggang Ke, Ralf Jungmann and Peng Yin
	Kinetics in a DNA Flatland: Two-Dimensional Crowding Perturbs Hybridization on Single Origami Arrays	Alexander Johnson-Buck, Jeanette Nangreave, Shuoxing Jiang, Hao Yan and Nils Walter
	Enzyme Confinement and Regulation in a Self-Assembled, Nucleic Acid Matrix	Matteo Castronovo, Shiv Redhu, Marco Vidonis, Agnese Lucesoli, Pietro Parisse, Anastasia Kurnikova, Aseem Malhotra, Mario Grassi, Gabriele Grassi, Bruna Scaggiante, Loredana Casalis, Giacinto Scoles and Allen Nicholson
	A 'Swing Arm'-channeled multienzyme cascade organized by DNA nanoscaffolds	Jinglin Fu, Yuhe Yang and Hao Yan
	3-Input Majority Logic Gate and Multiple Input Logic Circuit Based on DNA Strand Displacement	Wei Li, Yang Yang, Hao Yan and Yan Liu
	Local Hybridization Chain-Reactions on DNA Nanostructures	Hieu Bui, Tianqi Song, Sudhanshu Garg, Reem Mokhtar, Harish Chandran and John Reif
	Connectable DNA logic gates based on crossover tiles	Yulia Gerasimova, Evan Cornett, Martin O'steen, Eleanor Campbell and Dmitry Kolpashchikov
	Increase in the number of visible features per sample in fluorescence microscopy by Polychromatic Address Multiplexing	Mohammad Mottaghi and Chris Dwyer
	RNA-Protein-based nanostructures and translational switches	Hirohide Saito
	Controlled assembly of higher-order DNA origami structures	Anja Henning and Michael Mertig
	DNA Pen: A Tool for Drawing on a Molecular Canvas	Arnav Goyal, Dixita Limbachiya, Shikhar Kumar Gupta, Foram Joshi, Sushant Pritmani, Akshita Sahai and Manish Kumar Gupta
	Fleeting secondary structure effects on hybridization kinetics for DNA nanotechnology/computing	Hiroaki Hata and Akira Suyama
	Assembly of cylindrical DNA Origami nanostructures	Jianghong Min, Shelley Wickham, Nandhini Ponnuswamy, Seungwoo Lee and William Shih
	Aptamers for comparing oranges and apples	Kyung-Ae Yang
	New inhibitory architecture for in vitro DNA reaction networks	Alexandre Baccouche, Teruo Fujii and Yannick Rondelez
	Precise Structure Switching of Three-State Nanomechanical DNA Origami Devices	Akinori Kuzuya, Ryosuke Watanabe, Masafumi Kaino, Shinya Minamida, Mirai Hashizume and Yuichi Ohya
	DNA logic gates assembled on a two-dimensional DNA scaffold	Yulia Gerasimova and Dmitry Kolpashchikov
	Switching a bistable DNA circuit electrically	Alexis Vlandas, Adrien Padirac, Yannick Rondelez and Andre Estevez-Torres
	Design and Operation of an Autocatalytic Seesaw Gate DNA Network	Michael Tobiason, Elton Graugnard and William Hughes
	Dynamic AND Gate Module for RTRACS	Takashi Nukada, Koh-Ichiroh Shohda and Akira Suyama
	DNA Computer-Controlled Gene Expression in a Cell Model Vesicle	Takamasa Hasegawa, Koh-Ichiroh Shohda and Akira Suyama

Group	Title	Author(s)
III	A Thermal, Autonomous Replicator Made from Transfer RNA	Simon Lanzmich
	Gold Nanoparticles assembly clusters based on Hairpin DNA	Cheng Zhang, Jingjing Ma and Jing Yang
	DNA enables the self-assembly of discrete plasmonic nanostructures from one- to two- and three-dimension	Xiang Lan, Zhong Chen and Qiangbin Wang
	Shape-specific fabrication of inorganic nanomaterials directed by programmable DNA nanostructures	Wei Sun, Zhong Jin, Michael Strano and Peng Yin
	Isothermal Self-assembly of DNA Tiles under Diverse and Biocompatible Conditions	Cameron Myhrvold, Mingjie Dai, Pamela Silver and Peng Yin
	Mapping the Thermal Behavior of DNA Origami Nanostructures	Xixi Wei, Yan Liu and Hao Yan
	DNA hybridization mechanism under different temperature and solvent circumstance	Jie Song, Zhao Zhang, Kurt V. Gothelf, Flemming Besenbacher and Mingdong Dong
	DNA-Cholesterol Rafts as Remote Agents for Exploring and Interacting with Lipid Membrane Systems	Alexander Johnson-Buck, Shuoxing Jiang, Hao Yan and Nils Walter
	Microscopic Structure of DNA Nanotubes	Himanshu Joshi, Anjan Dwaraknath and Prabal K. Maiti
	DNA Constructs for Artificial Light Harvesting	Jakob Woller, Bo Albinsson and Patrik Johansson
	DNA Nano-Structure Scaffolded Liposome Formation	Yang Yang, Jing Wang, Patrick Ellis, William Shih, James Rothman and Chenxiang Lin
	Construction of a DNA-based stimuli-responsive microhydrogel	Takashi Kitajima, Ken Komiyama, Masayuki Hayakawa, Masahiro Takinoue and Masayuki Yamamura
	Structure-based Modelling of Biomimetic Light-harvesting Antennas	Lun Yang, Keyao Pan and Mark Bathe
	Synthetic lipid membrane channels formed by designed DNA nanostructures	Martin Langecker, Vera Arnaut, Thomas G. Martin, Jonathan List, Stephan Renner, Michael Mayer, Hendrik Dietz and Friedrich C. Simmel
	Development of biophysical tools using DNA origami: Membrane-fusion	Bhavik Nathwani, Chenxiang Lin, Weiming Xu, James Rothman and William Shih
	Small, highly-active DNAs that hydrolyze DNA	Hongzhou Gu, Kazuhiro Furukawa, Zasha Weinberg, Daniel Berenson and Ronald Breaker
	Toward Gel-sol Transition of Hydrogel Driven by DNA Devices	Ibuki Kawamata, Sathoshi Murata and Masami Hagiya
	Detection of temperature Changes in Hela Cells by Thermal-Sensitive DNA	Lingda Xu and Yongli Mi
	A DNA-Based pH-Responsive Nanocarrier System For Targeted Drug Delivery	Wen Wang, Xiaojin He and Yongli Mi
	SERS Plasmonic Enhancement using DNA Origami-based Complex Metallic Nanostructures	Mauricio Pilo-Pais, Anne Watson, Steven Demers, Thomas Labeau and Gleb Finkelstein
Long-Term Operability of a DNA-based Nanomachine in Human Serum	Sara Goltry, Natalya Hallstrom, Tyler Clark, Jeunghoon Lee, William B. Knowlton, Elton Graugnard and William L. Hughes	
A Leak-Reduction Technique for DNA Strand Displacement Circuits	Xiaoping Olson, Natalya Hallstrom, Sara Goltry, Elton Graugnard and William L. Hughes	
Crystal Resolution Dependence on Sticky Ends and 5'-Phosphates in Self-Assembled Two-Turn DNA Tensegrity Triangles	Yoel P. Ohayon, Arun Richard Chandrasekaran, Esra Demirel, Sabine I. Obbad, Rutu C. Shah, Sadeea Rahman, Munsath Ashraf, Dong H. Kim, Victoria Zlotnikova, Meet Barot, Daniel Simon, Ruojie Sha, Jens J. Birktoft, Paul M. Chaikin and Nadrian C. Seeman	
Triplex Formation on a Tensegrity Triangle Motif	Arun Richard Chandrasekaran, David Rusling, Yoel Ohayon, Ruojie Sha, Jens Birktoft and Nadrian Seeman	

