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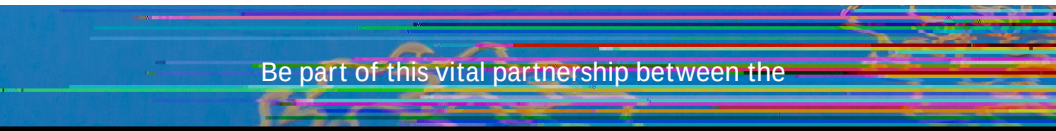
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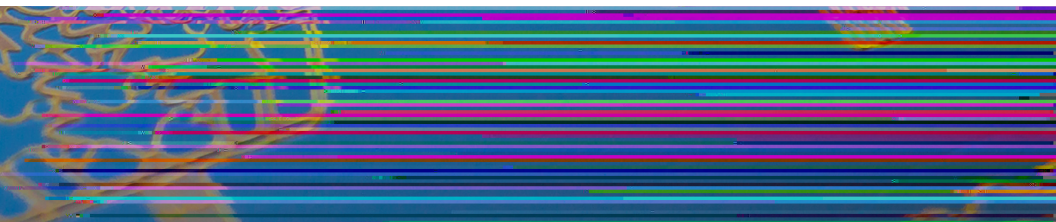


Table of Contents

FACULTY TALKS

Departments and Research Centers

Research Expo Poster Judgesxpon #MCID 131R3 45.36 1N2 (2(J)o.6 4(h)152 (510.6 (er)-6.

2:30 PM

A SYSTEMS APPROACH TO ENGINEERING MAMMALIAN CELLS FOR BETTER THERAPEUTICS

Nathan Lewis, Professor, Department of Pediatrics, UC San Diego School of Medicine

Over the past three decades, mammalian cells have emerged as key hosts for the production of therapeutic proteins. Indeed, of the top ten pharmaceuticals by global sales in 2014, six are produced in mammalian cells, such as Chinese hamster ovary (CHO) cells. Furthermore, in just the last few years, over half a trillion dollars worth of product has been produced in CHO cells. However, despite the success of several protein-based drugs, there is a growing awareness of the importance of controlling critical quality attributes (CQAs) that impact drug safety and efficacy, and that rational cell line engineering is often needed to control product quality. The hurdles limiting mammalian cell engineering are just now being overcome with the emergence of novel tools, resources, and analysis methods. In the CHO Systems Biology Center in the Jacobs School of Engineering, we are developing ge.1 (r)-149 (d2 Tw 9e)11.5 (a)-662 Tw 011.5 (a)-7.

3:00 PM

3:30 PM

THE CHEMICAL ROLE OF 4 POUNDS OF BACTERIA THAT LIVE IN AND ON EACH OF US

Pieter Dorrestein, Professor of Pharmacology, Chemistry and Biochemistry

Here we describe the generation, processing, and analysis of multi-omics data platforms from human, environmental, and animal samples as a part of the the newly established Center for Microbiome Innovation and describe what opportunities there are to get involved with the center. With 16S rRNA amplicon, metagenomic and transcriptomic sequencing and mass spectrometry, we explore the relationship between chemistry and microbial communities. We will showcase how we can map such information with human skin and lungs in 3D. The first paper of the center that was submitted demonstrated that we can go from sample to data conclusions in less than 48 hours. While not yet routine, this achievement has far-reaching implications because it demonstrates that multi-omics methods can be applied in clinically relevant timeframes and approaches the speed of classical microbiology experiments.

4:00 PM

ADVANCED MATERIALS AND MANUFACTURING PROMOTING INTERDISCIPLINARY RESEARCH AND STUDENT MOBILITY

Olivia Graeve, Professor of Mechanical and Aerospace Engineering

The CaliBaja Center for Resilient Materials & Systems supports and promotes research ac t vi t es and technology development in the CaliBaja region, with emphasis in three strong technology sectors of the region: aerospace, biomedical devices, and manufacturing. The Center also connects the humani t es, environmental sciences, and social sciences to promote bi-na t onal student mobility and scien t f c collabora t ons. The Center brings together a mul t disciplinary team of researchers and scholars that are highly responsive to: (1) the challenge of designing materials and systems for extreme environments such as those found in a variety of engineering applica t ons (i.e., ultra-high temperatures, extr t oon

GRADUATE STUDENT POSTERS

SUSTAINABLE POWER AND ENERGY CENTER

1. IMPROVED, LOW-COST SILICON SOLAR CELL EMITTERS PRODUCED VIA LIQUID PHASE EPITAXY DOPING
Student: Ernesto Magana | Professor: David Fenning

2. SPATIALLY HETEROGENEOUS CHLORINE INCORPORATION IN ORGANIC-INORGANIC PEROVSKITE SOLAR CELLS
Student: Yanqi Luo | Professor: David Fenning

3. PREDICTING THE MECHANICAL PROPERTIES OF ORGANIC SEMICONDUCTORS
Student: Samuel Evan Root | Professors: Darren J. Lipomi, Gaurav Arya

4. LIQUEFIED GAS SOLVENT BASED ELECTROLYTE FOR ELECTROCHEMICAL ENERGY STORAGE DEVICE
Students: Yangyuchen Yang, Cyrus Rustomji | Professor: Ying S. Meng

5. ADDITIVES IN PEROVSKITE SOLAR CELL PLAY KEY ROLE
Student: Shen Wang | Professor: Ying S. Meng

6. DOPING STRATEGIES TO ENHANCE THE NA+ CONDUCTIVITY OF THE CUBIC NA3PS4 SUPERIONIC CONDUCTOR
Student: Zhuoying Zhu | Professor: Shyue Ping Ong

7. DISCOVERY OF NOVEL NARROW-BAND RED PHOSPHORS USING

CENTER FOR WEARABLE SENSORS

9. **A FULLY INTEGRATED 144 MHZ WIRELESS-POWER-RECEIVER-ON-CHIP WITH AN ADAPTIVE BUCK-BOOST REGULATING RECTIFIER AND LOW-LOSS H-TREE SIGNAL DISTRIBUTION**
   Students: Chul Kim, Jiwoong Park, Abraham Akinin, Sohmyung Ha, Rajkumar Kubendran, Hui Wang

CENTER FOR VISUAL COMPUTING

21. UNIFIED SHAPE AND BRDF ACQUISITION BY PHOTOMETRIC STEREO

Professors: David Kriegman, Ravi Ramamoorthi

22. ALBEDO CORRECTION FOR RENDERING DOWNSAMPLED HETEROGENEOUS MEDIA

Student: Lifan Wu | Professor: Ravi Ramamoorthi

23. SINGLE IMAGE 3D FACE RECONSTRUCTION

Student: Muhammad Ahmed Riaz | Professor: Ravi Ramamoorthi

24. PATCH-BASED TEXTURE MAP OPTIMIZATION FOR INACCURATE GEOMETRIES

Students: Sai Bi, Nima Khademi Kalantari | Professor: Ravi Ramamoorthi

25. MINIMAL BRDF SAMPLING FOR TWO-SHOT NEAR-FIELD REFLECTANCE ACQUISITION

Student: Zexiang Xu | Professor: Ravi Ramamoorthi

26. RENDERING GLINTS ON HIGH-RESOLUTION NORMAL-MAPPED SPECULAR SURFACES

Student: Lingqi Yan | Professor: Ravi Ramamoorthi

27. HOLISTICALLY-NESTED EDGE DETECTION

Student: Saining Xie | Professor: Zhuowen Tu

28. GENERALIZING POOLING FUNCTIONS IN CONVOLUTIONAL NEURAL NETWORKS: MIXED, GATED, AND TREE

Student: Chenyu Lee | Professor: Zhuowen Tu

29. REAL-TIME OBJECT DETECTION FOR ROBOTIC PLATFORMS

Student: Zhaowei Cai | Professor: Nuno M. Vasconcelos

38. MECHANICAL PROPERTIES OF PORCINE CORTICAL BONE AND BIOINSPIRED BONE: VERIFICATION OF THE INTERPENETRATING COMPOSITE STRUCTURE OF BONE

39. MAGNETIZED MATERIALS FOR BIOINSPIRED BONE SCAFFOLDS

Students: Michael Brian Frank, Sze Hei Siu, Jerry Ng, Ali Ismail, Ivan Torres, Chin-Hung Liu, Keyur Karandikar, Steven Naleway

40. 2-D BASED MICRO AND NANO FLUIDIC CHANNELS FOR SENSING AND FILTERING APPLICATIONS

Student: Yang Huang | Professor: Oscar Vazquez Mena

CENTER FOR EXTREME EVENTS RESEARCH

41. NUMERICAL SIMULATION OF HYDRAULIC FRACTURING USING MESHFREE METHOD
Student: Haoyan Wei | Professor: Jiun-Shyan Chen

42. TOWARDS IMAGE-BASED REAL-TIME SIMULATION FOR PATIENT-SPECIFIC SKELETAL MUSCLE
Student: Qizhi He | Professor: Jiun-Shyan Chen

43. RECENT ADVANCES IN MODELING EXTREME EVENTS AND APPLICATION TO HOMELAND SECURITY

BIOENGINEERING

46. MICROPOWER INTEGRATED NANO-ENGINEERED RETINAL INTERFACES

Students: Abraham Akinin, Sohmyung Ha
Professors: Gert Cauwenberghs, Gabriel A. Silva

55. A NOVEL APPROACH TO QUANTIFY THE DYNAMIC MATRIX MECHANICAL PROPERTIES DURING CANCER GROWTH

56. A NOVEL APPROACH TO QUANTIFYING THE DIFFUSIVITY OF A TUMOR

Student: Han Liang Lim | Professor: Shyni Varghese

57. AGE-RELATED IN VIVO BIOMATERIAL-MEDIATED BONE REGENERATION

Student: Mengqian Liu | Professor: Shyni Varghese

58. APPLICATION OF 3D ORGAN-ON-CHIP TECHNOLOGY TOWARDS CREATING IN VITRO CANCER MODELS

Students: Aereas Aung, Jomkuan Theprungsirikul
Professor: Shyni Varghese

59. BIOMINERALIZED MATERIAL-ASSISTED HEALING OF CRITICAL-SIZED BONE DEFECTS

Student: Eva Carolina Gonzalez Diaz | Professor: Shyni Varghese

60. ENGINEERED 3D SKELETAL MUSCLE-ON-A-CHIP AS AN IN VITRO TOOL

Student: Gaurav Agrawal | Professor: Shyni Varghese

61. MODULATION OF CELL-CELL AND CELL-SUBSTRATE INTERACTIONS TO CONTROL THE MORPHOLOGY OF PERFUSED 3D MULTICELLULAR CULTURES

Students: Nailah Makini Seale, Lynn Theprungsirikul
Professor: Shyni Varghese

COMPUTER SCIENCE & ENGINEERING

72. LOCALIZATION OF MOBILE UNDERWATER SENSORS USING AMBIENT ACOUSTIC NOISE
Student: Perry W. Naughton | Professor: Ryan Kastner

73. MACHINE LEARNING FOR SYSTEM LEVEL DESIGN SPACE EXPLORATION ON FPGAS

Professor: Ryan Kastner

74. SPHERECAM: AN ACOUSTIC-VIDEO SYSTEM FOR MONITORING ENDANGERED MARINE MAMMAL POPULATIONS

75. REDEFINING A CONSISTENT MICROBIAL REFERENCE DATABASE
Students: James Morton, Zech Xu | Professor: Rob Knight

76. FAST IN-MEMORY SQL ANALYTICS ON GRAPHS

77. PSEUDO-CHROMOSOME ASSEMBLY OF LARGE AND COMPLEX GENOMES USING MULTIPLE REFERENCES
Student: Mikhail Alekseyevich Kolmogorov
Professor: Pavel A. Pevzner

78. FIBBING TO ALLEVIATE CONGESTION IN WAN AND DATA CENTER NETWORKS

Professor: George M. Porter

79. A COMPUTATIONAL MODELING APPROACH OF USER BEHAVIOR FOR SWARM CONTROL APPLICATIONS

80. APPROXIMATE COMPUTING USING CONFIGURABLE ASSOCIATIVE MEMORY
Student: Mohsen Imani | Professor: Tajana S. Rosing

81. TIME SERIES DATA CLUSTERING FOR INTERNET OF THINGS IOT APPLICATIONS
Student: Akanksha Maurya | Professor: Tajana S. Rosing

82. CHARACTERIZING RESIDENTIAL BROADBAND PERFORMANCE IN THE UNITED STATES: INFERRING CONGESTION ON INTERDOMAIN LINKS

Student: Alexander Manuel Gamero Garrido

83. THE CRISP PERFORMANCE MODEL FOR GPGPUS

Student: Rajib Kumar Nath | Professor: Dean Tullsen

ELECTRICAL & COMPUTER ENGINEERING

84. 4×4 COMPLEX MIMO 2.4 PJ/MAC 2.4 MHZ BASEBAND MIXED-SIGNAL SPATIAL PROCESSOR WITH 84 DB INTERFERENCE SUPPRESSION IN 65NM CMOS
Students: Siddharth Joshi, Chul Kim, Sohmyung Ha
Professor: Gert Cauwenberghs

85. DEVELOPMENT AND IMPLEMENTATION OF FLEXIBLE, CONFORMAL AND HIGH DENSITY HUMAN CORTICAL IMPLANTS
Student: Mehran Ganji | Professor: Shadi A. Dayeh

86. COMBINING EEG-BASED MOTOR IMAGERY BCI WITH SUBJECT RESPONSE TO VISUAL FEEDBACK
Student: Mahta Mousavi | Professor: Virginia De Sa

87. CLOUD-BASED MOBILE HEALTH MONITORING AND GUIDANCE SYSTEM
Students: Wenchuan Wei, Yao Lu | Professor: Sujit Dey

88. RENEWABLE ENERGY-AWARE VIDEO DOWNLOAD IN CELLULAR NETWORKS
Student: Po-Han Chiang | Professor: Sujit Dey

89. INTEGRATED SURFACE PLASMON RESONANCE AND FARADAIC ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY DEVICE FOR BIOSENSING
Student: Brandon John Sung Hyun Hong | Professor: Y. Shaya Fainman

90. NON-DEGENERATE MULTIPHOTON MICROSCOPY FOR DEEP BRAIN IMAGING
Student: Muhan Yang | Professor: Y. Shaya Fainman

91. SPATIAL AND WAVELENGTH CONVERSION PROCESSES IN INTEGRATED OPTICAL DEVICES

Andrew Grieco | Professor: Y. Shaya Fainman

92. SIMULATED RAMAN CORRELATION SPECTROSCOPY FOR NUCLEIC ACID-SILVER COMPOSITES BINDING ANALYSIS
Students: Lindsay Michelle Freeman, Alexei Smolyaninov, Lin Pang
Professor: Y. Shaya Fainman

93. ESTIMATING MOTOR SCORES WITH ACCELEROMETERS IN THE NEURO ICU

Students: John Hermiz, Alfredo Lucas, Venkatesh Elango
Professor: Vikash Gilja

94. NEURAL CORRELATES TO AUTOMATIC BEHAVIOR

112. STEREO PANORAMA STITCH BASED ON POINT CLOUD REPROJECTION
Student: Ji Dai | Professors: Truong Nguyen, Jurgen P. Schulze

113. LEAKAGE FIELD PROFILES BY NONLINEAR METAMATERIAL ABSORBERS
Student: Sanghoon Kim | Professor: Daniel F. Sievenpiper

114. METASURFACE BASED MICRO-PLASMA DEVICES
Student: Shiva Piltan | Professor: Daniel F. Sievenpiper

115. PATTERNING TECHNIQUE FOR GENERATING ARBITRARY ANISOTROPIC IMPEDANCE SURFACES
Student: Ji Yeon Lee | Professor: Daniel F. Sievenpiper

116. SCALABLE HIGH POWER MICROWAVE SOURCE & TUNABLE THRESHOLD NONLINEAR ABSORBING METASURFACES
Student: Aobo Li | Professor: Daniel F. Sievenpiper

117. CNN HAND AND FACE DETECTOR WITH HEAD POSE ESTIMATION ON THE ROAD
Student: Kevan Chun Yiu Yuen | Professor: Mohan M. Trivedi

118. EMBEDDED VISION SYSTEM FOR SURROUND UNDERSTANDING OF HIGHWAY DRIVING
Student: Sean Lee | Professor: Mohan M. Trivedi

119. LOOKING AT PEDESTRIANS AT DIFFERENT SCALES: A MULTI-RESOLUTION APPROACH AND EVALUATIONS

120. LONG-TERM, MULTI-CUE TRACKING OF HANDS IN VEHICLES
Student: Akshay Rangesh | Professor: Mohan M. Trivedi

121. MONITORING DRIVER BEHAVIOR AND GENERATING DRIVE-QUALITY REPORTS ON EMBEDDED COMPUTING PLATFORMS
Student: Frankie Lu | Professor: Mohan M. Trivedi

122. THE RHYTHMS OF HEAD, EYES AND HANDS AT STOP CONTROLLED INTERSECTIONS

123. SELF-CATALYZED GA(N)ASP NANOWIRES AND GAASP/GANASP CORE-SHELL NANOWIRES GROWN ON SI (111) BY GAS-SOURCE MOLECULAR BEAM EPITAXY
Student: Rui La | Professor: Charles W. Tu

124. BAYESIAN MODEL ADAPTATION FOR CROWD COUNTS
Student: Bo Liu | Professor: Nuno M. Vasconcelos

125. 3D NANO-FABRICATION AND LOW VOLTAGE NANO-ELECTRO-MECHANICAL SYSTEMS (NEMS)
Student: Zhelin Sun
Professors: Jie Xiang, Yu-Hwa Lo, Yuan Taur, Prabhakar R. Bandaru, Renkun Chen

126. DENSE RECONSTRUCTION AND VISUAL TRACKING FOR MINIMALLY INVASIVE SURGERY
Student: Yi Luo | Professor: Michael Yip

127. DEVELOPMENT OF A MODULAR COLONOSCOPY ROBOT
Student: Kwesi Joe Rutledge | Professor: Michael Yip

MECHANICAL & AEROSPACE ENGINEERING

128. GRAPHENE OXIDE AS A P-DOPANT AND ANTI-REFLECTION COATING LAYER, IN GRAPHENE /SILICON SOLAR CELLS
Student: Serdar Yavuz | Professor: Prabhakar R. Bandaru

129. MODELS FOR IMPEDANCE MATCHED PLASMONIC GRATINGS
Student: Anna Alexander | Professor: Prabhakar R. Bandaru

130. MAGNETO CALORIC PROPERTIES OF NANO-GRAINED NIMNSN HEUSLER ALLOY
Student: Dongwon Chun | Professors: Renkun Chen, Sungho Jin

131. OPTIMAL FILTERING FOR GRID EVENT DETECTION FROM REAL-TIME SYNCHROPHASOR DATA
Student: Sai Akhil Reddy Konakalla
Professor: Raymond A. De Callafon

132. REAL-TIME ACTIVE DAMPING CONTROL OF REAL POWER FLUCTUATIONS
Student: Xin Zhao | Professor: Raymond A. De Callafon

133. WILDFIRE SPREAD PREDICTION AND ASSIMILATION FOR FARSITE USING ENSEMBLE KALMAN FILTERING
Student: Thayjesnarayankannapp Srivas
Professor: Raymond A. De Callafon

134. FABRICATION OF MONO-SIZED MESOPORES ON GOLD-COATED POLYSTYRENE PARTICLE SURFACES FOR ENZYME IMMOBILIZATION
Student: Seongcheol Choi | Professor: Olivia A. Graeve

135. OPTIMAL SWITCHABLE LOAD SIZING AND SCHEDULING FOR STANDALONE RENEWABLE ENERGY SYSTEMS
Student: Abdulelah Habib
Professors: Jan P. Kleissl, Raymond A. De Callafon

136. ASSESSMENT AND APPLICATION OF 3D PRINTED TURBINE BLADES
Student: Spencer Riley Ellis | Professor: John B. Kosmatka

137. EVALUATION OF FIBER OPTIC STRAIN SENSORS FOR

138. AUTOMATING PARTICLE ACCELERATOR SUBSYSTEMS

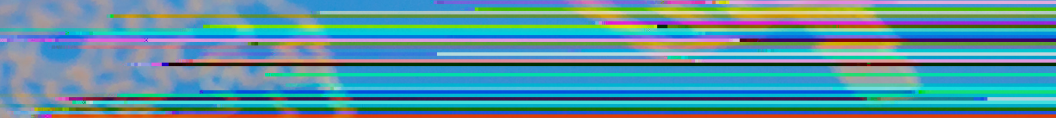
139. BOUNDARY CONTROL AND ESTIMATION OF A SOLID-LIQUID INTERFACE IN A MELTING MATERIAL

140. CONTROL OF EXTREME ULTRAVIOLET LIGHT GENERATION VIA INFINITE DIMENSIONAL BACKSTEPPING

141. OBSERVER DESIGN FOR AN IPDE WITH TIME-VARYING COEFFICIENTS

142. STATE AND PARAMETER ESTIMATION IN LITHIUM-ION BATTERIES WITH MULTIPLE MATERIAL ELECTRODES

143. THREE-DIMENSIONAL PROPAGATION OF TSUNAMI-GENERATED INTERNAL WAN8 (T60180062) .85 kC20 10 (T)1.3 (- 48.4 (A)64



159. DEVELOPMENT OF AN OPTICAL BASED INTRAOCULAR PRESSURE SENSOR

168. EROSION OF AL IN DIII-D TOKAMAK DIVERTOR AND PISCES-B LINEAR PLASMAS

NANOENGINEERING

173. ACCELERATED DEGRADATION OF HYDROGEN PEROXIDE SENSITIVE POLYMERIC NANOPARTICLES VIA CHEMICAL AMPLIFICATION
Student: Sangeun Lee | Professor: Adah Almutairi

174. ANISOTROPIC INTERACTIONS BETWEEN ISOTROPIC, GRAFTED SPHERICAL NPS WITHIN A POLYMER MATRIX
Student: Tsungyeh Tang | Professor: Gaurav Arya

175. ATOMISTIC, COARSE-GRAINED, AND STATISTICAL MECHANICAL MODELING OF DYNAMIC DNA NANOSTRUCTURES
Student: Ze Shi | Professor: Gaurav Arya

176. SYNTHESIS AND INTEGRATION OF NANOFIBERS FOR MINIMALLY INVASIVE NEURAL STIMULATION
Student: Spencer Patrick Ward

182. A ONE-DIMENSIONAL OPTICAL WAVEGUIDE PLATFORM FOR THE STATISTICAL CHARACTERIZATION OF COLLOIDAL PARTICLES

Students: Joshua Tan Villanueva, Qian Huang
Professor: Donald J. Sirbuly

183. DESIGN AND APPLICATION OF PIEZOELECTRIC COMPOSITE MATERIALS

Professor: Donald J. Sirbuly

184. HIGH QUALITY HYPERBOLIC AND PLASMONIC METAMATERIALS DEPOSITED BY ATOMIC LAYER DEPOSITION

Student: Conor Tomas Riley | Professors: Donald J. Sirbuly, Zhaowei Liu

185. NANOPARTICLE-POLYMER-NANOFIBER OPTICAL PROBE FOR BIOLOGICAL MECHANICAL MEASUREMENTS

Josh Villanueva, Spencer Patrick Ward | Professor: Donald J. Sirbuly

186. PNEUMATICALLY INFLATED ESD EWOS I6 (S D)-9.1 E(D E)-14.2 IAYLS D1

191. TWO-DIMENSIONAL ELECTRON GAS DRIVEN BY STRAIN-INDUCED POLARIZATION IN NONPOLAR AHFO3/SRTIO3 (001) (A=CA, SR, AND BA) HETEROSTRUCTURE: FIRST-PRINCIPLES ANALYSIS

Student: Jianli Cheng | Professor: Kesong Yang

192. COATING NANOFIBER SCAFFOLDS WITH BETA CELL MEMBRANE TO PROMOTE CELL PROLIFERATION AND FUNCTION

Student: Qiangzhe Zhang | Professor: Liangfang Zhang

193. PLATELET MEMBRANE-COATED NANOPARTICLES FOR BIOINTERFACING

Students: Ashley Victoria Kroll, Diana Dehaini
Professor: Liangfang Zhang

203. INVESTIGATION OF DELAMINATION BEHAVIOR AT THE VICINITY OF FASTENER LOCATIONS IN COMPOSITE STRUCTURES

212. COMPOSITE STRUCTURES WITH EMBEDDED FIBER OPTIC SENSORS
Student: Anthony Joseph Whitaker | Professor: Michael D. Todd

213. ESTIMATING POWER FROM A DOWNHOLE PIEZOELECTRIC ENERGY HARVESTING SYSTEM
Student: Eric John Kjolsing | Professor: Michael D. Todd

214. EXPERIMENTAL STUDY OF PROPPANT PARTICLE-PARTICLE INTERACTION MICROMECHANICS DURING FLOW AND TRANSPORT IN THE FRACTURE
Student: Lan Luo | Professor: Ingrid Tomac

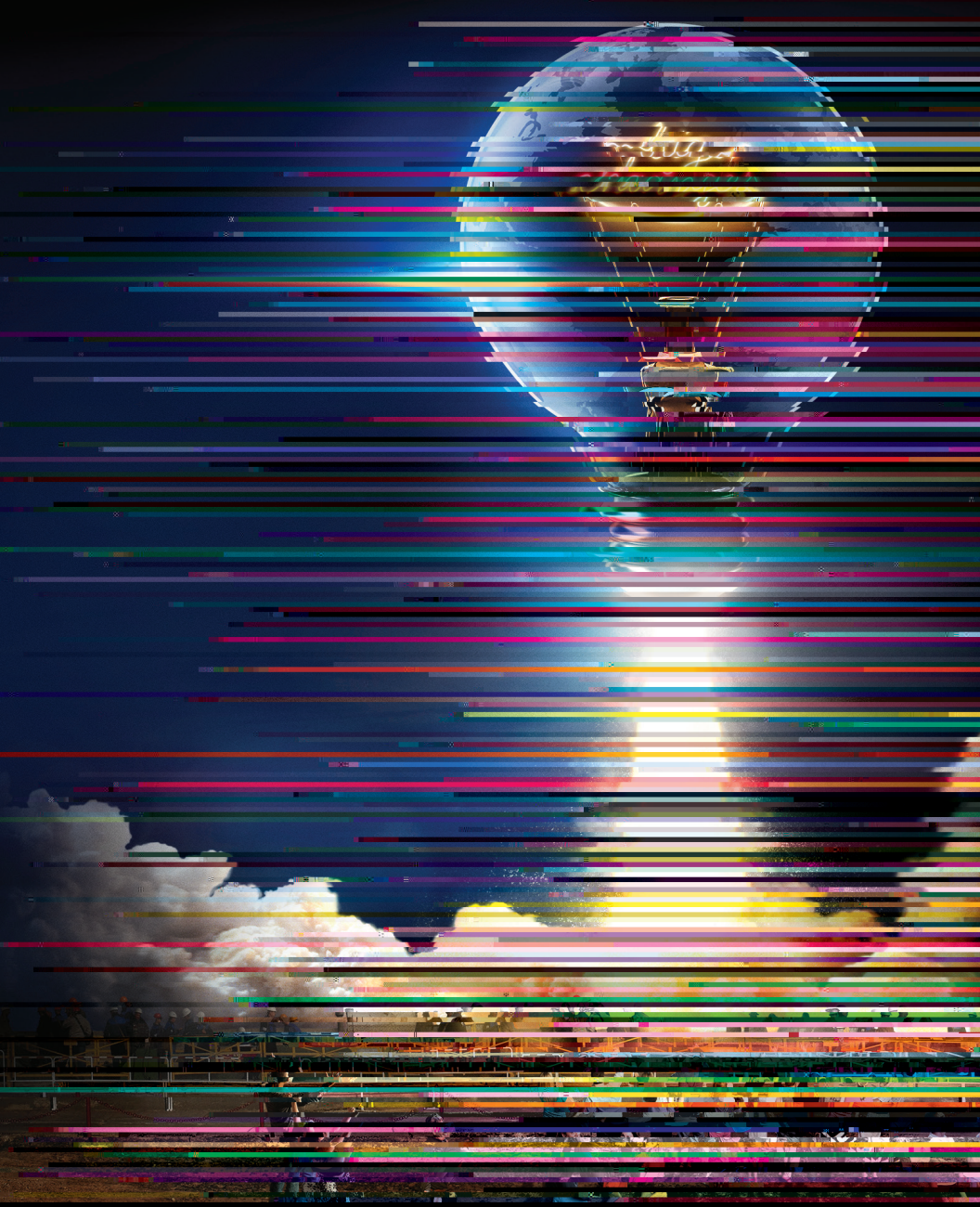
215. SAN DIEGO-TIJUANA EARTHQUAKE SCENARIO

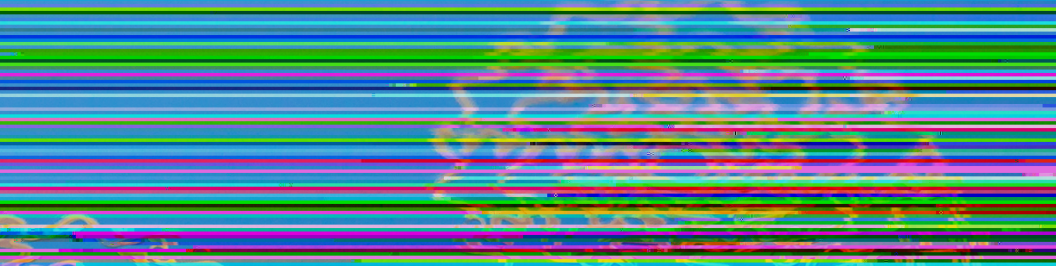
DEPARTMENTS AND RESEARCH CENTERS

CaliBaja Center for Resilient Materials & Systems	resilientmaterials.ucsd.edu
CHO Systems Biology Center	cho.ucr7130.9 (T)1.[illegible]

Alex Barajas	Envision Engineering
Charles Bergan	Qualcomm
Dus t n Blair	Illumina
Shane Bowen	Illumina
Je f Bri t an	SeaSpine
Kyle Bulloch	Thermo Fisher Scien t f c
Laura Cervino	UC San Diego
Richard Chen	Miyamoto Interna t onal
Sung Hwan Cho	NanoCellect Biomedical
Ted Clowes	Cubic Defense Applica t ons Group

Ma t hew Hedayat	STG
Lazarro Herrara	Solar Turbines
Leo Holland	General Atomics
Roger Hoyt	Hoyt Associates
David Hutches	UC San Diego





Poster Numbers

AGILE RESEARCH CENTERS

Sustainable Power and Energy Center	1-8
Center for Wearable Sensors	9-20
Center for Visual Computing	21-29
CaliBaja Center for Resilient Materials & Systems	30-40
Center for Extreme Events Research	41-45

ACADEMIC DEPARTMENTS

Bioengineering	46-61
Computer Science & Engineering	62-83
Electrical & Computer Engineering	84-127
Mechanical & Aerospace Engineering	128-172
NanoEngineering	173-193
Structural Engineering	194-215