**Panel on Human Factors Science at Army Research Laboratory (ARL)**

**Meeting at Human Research and Engineering Directorate (HRED)**

**HRED, Building 459, Aberdeen Proving Ground (APG), MD**

**29-31 May 2019**

**Agenda**

**Wednesday, 29 May 2019**

**DATA GATHERING SESSION OPEN TO THE PUBLIC**

***Location: Building 459 Collaboration Commons, APG, MD***

0945-1000 Welcome, Administrative Remarks and Introductions, **Dr. William Marras**, Panel Chair; ***Dr. Philip Perconti,*** Director, Army Research Laboratory (ARL); and **Dr. J. Corde Lane,** Director (A), HRED, ARL

1000-1030 ARL Overview Discussion and Q&A, ***Dr. Phil Perconti***, Director, ARL; and ***Dr. Alex Kott***, Chief Scientist, ARL

1030-1100 ARL Human Sciences Overview: Highlighting Change, **Dr. J. Corde Lane**, Director (A), HRED, ARL

*NOTES: All talks include time for Q&A. The programmatic talks aim to highlight Army relevance and how the science is expected to cumulate and transition. The overviews aim to highlight the basic and applied scientific goals and accomplishments.*

ARL ESSENTIAL RESEARCH PROGRAMS (ERPs): Human Autonomy Teaming (HAT) and Artificial Intelligence for Mobility and Maneuver (AIMM)

1100-1120 Human Autonomy Teaming (HAT) Overview and Interactions with Artificial Intelligence for Mobility and Maneuver (AIMM), **Dr. Amar Marathe,** HAT Program Manager

1120-1130 Novel Human-Autonomy Team Interactions Overview, **Dr. Gregory Gremillion**, Biomedical Engineer

1130-1145 (ERP) T1: Cycle of Learning for Autonomous Systems, **Dr. Nicholas Waytowich**, Machine Learning Scientist

1145-1200 *Break; Obtain Lunch from Chapel; Return to Collaboration Commons*

1200-1230 *Working Lunch:* How are Research Topics Selected? **Dr. Kaleb McDowell,** Chief Scientist, HRED

1230-1245 *Break*

1245-1315 Current and Future Research Approach of the INFORMS Laboratory: Enabling Science Transition, **Dr. Jeremy Gaston**, Chief, Synergistic Human-Machine Interfaces Branch

1315-1320 *Walk to Basement*

***Location: Building. 459 Basement, APG, MD***

1320-1345 Information for Mixed Squads (INFORMS) Laboratory Tour, **Dr. Bill Evans**, Chief, Integrated Capability Enhancement Branch

1345-1400 *Break and return to Collaboration Commons*

***Location: Building 459 Collaboration Commons, APG, MD***

1400-1410 Autonomy Understanding Humans Overview, **Dr. Sean Fitzhugh**, Research Sociologist

1410-1425 ERP T2: Estimating Human Performance across Varying Timescales with Non-invasive Physiological Measures, **Dr. Derek Spangler**, Postdoctoral Fellow

1425-1435 Humans Understanding Autonomy Overview, **Dr. Kristin Schaefer-Lay**, Engineer

1435-1450 ERP T3: Inferring and Characterizing Shared Spatial Mental Models from Planned Routes: Implications for Vehicle Crew Operations, **Dr. Brandon Perelman**, Research Psychologist

1450-1500 Estimating Human-Autonomy Team Outcomes Overview, **Dr. Jason Metcalfe**, Research Kinesiologist and Lead, Center for Agent-Soldier Teaming

1500-1515 *Break and Transport to Building 433 Innovation Commons*

***Location: Building 433 Innovation Commons, APG, MD***

1515-1625 ERP Demonstrations and Poster Session

Demonstrations

ERP D01: Innovation Commons, **Dr. Arwen DeCostanza**, Chief, Real-World Soldier Quantification Branch; and **Mr. Jonroy Canady**, Computer Engineer

ERP D02: Closed Loop: Providing Human State Prediction to Enable Future Army Systems to Adapt to Individuals in Real-Time, **Dr. Derek Spangler,** Postdoctoral Fellow

ERP D03: Cycle of Learning for Autonomous Systems, **Dr. Nicholas Waytowich**, Biomedical Engineer

Posters

ERP P01: Longitudinal Study of Relationships between Psychomotor Vigilance, Tonic and Phasic Pupil Diameter, and Natural Sleep History across 16 Weeks, **Dr. Steven Thurman**, Biologist (Neuroscience)

ERP P02: Real-time Prediction of Interbeat Interval, **Dr. Katherine Cox**, Research Psychologist

ERP P03: Human-AI Interactions for Intelligent Squad Weapons, **Dr. Brent Lance**, Chief (A), Future Soldier Technologies Division

ERP P04: Developing New Methods for Evaluating Human-Agent Team Communication**, Dr. Anthony Baker**, Postdoctoral Fellow

ERP P05: Soldier Intent for Fully-Responsive Autonomous Systems, **Dr. Eric Holder**, Research Psychologist

1625-1630 *Transport to Building 459 Collaboration Commons*

**DATA GATHERING SESSION: OPEN TO THE PUBLIC**

***Location: Vandiver Inn, 301 South Union Avenue, Havre de Grace, MD 21078, (410)939-5200***

1800-2000 *Joint Working Dinner*: ARLTAB Panel and ARL Personnel (presenters and

managers) Discussions

**Thursday, 30 May 2019**

**DATA GATHERING SESSION OPEN TO THE PUBLIC**

***Location: Building 459 Collaboration Commons, APG, MD***

ARL HUMAN SCIENCES CORE COMPETENCIES (CC): Cognitive Dominance; Intuitive Naturalistic Technologies; Group Performance and Synergies

0830-0845 Constant Growth and Change in Core Competencies: From Perceptual Sciences, Neuroscience, and Network Sciences to the Future, **Dr. Kaleb McDowell,** Chief Scientist, HRED

*Human Interest Detection Talks*

0845-0905 A Framework for Using Gaze Position and Neural Activity to Enable Group Level Situational Awareness, **Dr. Jonathon Touryan**, Neuroscientist

0905-0920 CC T1: Decoding P300 Variability using Convolutional Neural Networks, **Ms. Amelia Solon**, Computer Engineer

0920-0935 CC T2: Tackling the Challenges of Real-World Neuroimaging, **Dr. W. David Hairston**, Neuroscientist

0935-0945 *Transport to Building 433, Innovation Commons*

***Location: Building 433 Innovation Commons, APG, MD***

0945-1030 Neuroscience and Training Effectiveness Demonstrations and Poster Session

Demonstrations

CC D1: Human Interest Detector, **Dr. Stephen Gordon,** Engineer and Branch Manager, DCS Corporation

CC D2: Real-World Neuroimaging and EEG Phantoms, **Dr. W. David Hairston,** Neuroscientist

CC D3: Brain Dynamics of Driver-Passenger Dyadic Communication, **Dr. Jason Metcalfe**,Research Kinesiologist and Lead, Center for Agent-Soldier Teaming

Posters

CC P01: CC P01: Naturalistic Sleep Moderates the Effects of Brain Network Dynamics on Visual Working Memory Performance, **Dr. Nina Lauharatanahirun**, Neuroscientist

CC P02: Brain Network Communities between Driver-Passenger Dyads Capture Successful Communication While Driving**, Dr. Javier Garcia**, Neuroscientist

CC P03: Functional Brain Network Architecture Supporting the Learning of Social Versus Non-Social Networks, **Dr. Jean Vettel**, Biologist (Neuroscience) **(Presented By Dr. Steve Tompson**,Social Neuroscientist)

CC P04: Cognitive Chimera States in Human Brain Networks**, Dr. Kanika Bansal**, Physicist

CC P05: Impact of Small World Connectivity on a Multi-Region Model of Cerebral Cortex, **Dr. David Boothe**, Neuroscientist

CC P06: Transcranial Direct Current Stimulation (tDCS) is Impacted by Neuronal Morphology and Spatial Configuration, **Dr. Alfred Yu**, Psychologist

CC P07: Prevention Focus Relates to Performance on a Loss-Framed Inhibitory Control Task, **Dr. Ben Files**, Biologist **(Presented By Dr. Brent Lance**, Chief (A), Future Soldier Technologies Division**)**

CC P08: Level of Immersive Technology Affects Spatial Learning in Virtual Training Environments, **Dr. Kimberly Pollard**, Research Biologist

1030-1040 *Break and Transport to Building 520, Future INFORMS Facility*

***Location: Building 520 Future INFORMS Facility, APG, MD***

1040-1125 Cyber Science and Kinesiology Poster Session

Demonstrations

CC D4: Application of Tools/Techniques (Wireless EMG and Inertial Measurement Based Metrics) for Assessment of Soldier-System Performance as Demonstrated Using Third Arm Exoskeleton, **Dr. Angela Boynton**, Biomedical Engineer

Posters

CC P09: Performance Assessment Suite for the Cyber Mission Force, **Dr. Norbou Buchler**, Cognitive Scientist

CC P10: Joint Cyber Contextualized Operator Perspective (COP) Program -- Task 5: Explainable AI Applied as a Junior Threat and Vulnerability Analyst**, Dr. Eric Holder**, Research Psychologist;and **Ms. Kristin Schweitzer**, Mechanical Engineer

CC P11: Team Performance in a Series of Cybersecurity Defense Competitions: Generalizable Effects of Training-Type and Functional Role Specialization, **Dr. Claire La Fleur**, Postdoctoral Fellow

CC P12: Participation Shifts Explain Degree Distributions in a Human Communications Network, **Dr. Ben Gibson**, Postdoctoral Fellow

CC P13: Biomechanical Characteristics of Operationally-Relevant Movements, **Dr. Courtney Haynes**, Biomechanist

CC P14: Human Intent via Muscle-Derived Neural Signals for Human-Machine Interfaces, **Dr. Cortney Bradford**, Neuroscientist

CC P15: Neural Indices of Human Adaptation to Autonomous, Lower-Extremity Exoskeleton, **Dr. Cortney Bradford**, Neuroscientist

1125-1135 *Return to Building 459 Collaboration Commons*

***Location: Building 459 Collaboration Commons, APG, MD***

1135-1145 Strengthening Teamwork for Robust Operations with Novel Groups (STRONG): A new ARL Business Model for Collaboration, **Dr. Arwen DeCostanza**, Chief, Real-World Soldier Quantification Branch

1145-1200 CC T3: A Framework for Enhancing Human-Agent Teamwork through Adaptive Individualized Technologies, **Dr. Addison Bohannon**,Mathematician

1200-1250 *Lunch Break*: Post-doctoral Associates and Early Career Scientists Lunch

1250-1300 Closing Remarks, **J. Corde Lane**, Director (A), HRED

**DATA GATHERING SESSION: OPEN TO THE PUBLIC**

***Location: Building 459 Several Conference Rooms, APG, MD***

1500-1600 Small Group Panel Meetings with ARL Scientists

* *ERP A: Novel Human-Autonomy Team Interactions and Humans Understanding Autonomy*
* *ERP B: Autonomy Understanding Humans and Estimating Human-Autonomy Team Outcomes*
* *CC A: Human Interest Detection*
* *CC B: Cyber Science and Kinesiology*
* *CC C: Neuroscience, Training Effectiveness and STRONG*
* *Panel Chair with HRED Director and Senior Leadership*

**Friday, 31 May 2019**

**DATA GATHERING SESSION: OPEN TO THE PUBLIC**

***Location: Building 459 Collaboration Commons, APG, MD***

1100-1200 Panel Meets with ARL Scientists and Management

1200 Panel Adjourns

1200-1300 Panel Chair and National Academies Staff Meets with ARL Director