

The Graduate and Professional Student Senate at  
Virginia Tech

*presents*

**The 40<sup>th</sup> Graduate Research Symposium**  
**Horizons of Tomorrow: Innovation, Diversity,  
Collaboration, and Advancement**



Wednesday March 27, 2024

8am – 7pm

Graduate Life Center

Virginia Tech, Blacksburg, Virginia

## **Schedule at a Glance**

|                      |  |
|----------------------|--|
| 8:00 AM – 9:00 AM:   | <i>Morning Registration, Breakfast Pastries</i>    |
| 9:00 AM – 10:00 AM:  | <i>Oral Session 1 (Symposium &amp; Flash Talk)</i> |
| 10:00 AM – 11:00 AM: | <i>Poster Session 1</i>                            |
| 11:00 AM – 12:00 PM: | <i>Oral Session 2 (Symposium &amp; Flash Talk)</i> |
| 12:00 PM – 1:00 PM:  | <i>Afternoon Registration, Lunch</i>               |
| 1:00 PM – 2:00 PM:   | <i>Poster Session 2</i>                            |
| 2:00 PM – 3:00 PM:   | <i>Oral Session 3 (Symposium &amp; Flash Talk)</i> |
| 3:00 PM – 4:00 PM:   | <i>Oral Session 4 (Symposium)</i>                  |
| 4:00 PM – 5:00 PM:   | <i>Networking/Social/Break</i>                     |
| 5:00 PM – 6:00 PM:   | <i>Dinner</i>                                      |
| 6:00 PM – 7:00 PM:   | <i>Keynote</i>                                     |
| 7:00 PM – 7:15 PM:   | <i>Awards &amp; Closing</i>                        |

We Welcome Our 2024 Keynote Speaker!

Dr. Lee Vinsel

*Assistant Professor*

*Department of Science, Technology, and Society*



**Horizons of Tomorrow: Innovation, Diversity, Collaboration, and  
Advancement**

There seems to be broad agreement in universities today that higher education should play various roles in fostering a better future and that it should do so in ways that are inclusive, diverse, and interdisciplinary. The question is, how? In this talk, I will begin by exploring an option that we should not pursue, even though some quarters are calling for it - academics producing richly-imagined “futures.” I will argue that such calls do not recognize human cognitive limits and that richly-imagined “futures” can even harmfully lead us astray in decision- and policy-making contexts. Instead, I will propose that universities can contribute the most to improved tomorrows by increasing understanding of technical and social worlds—the core mission of all higher learning—and by focusing on policy tools and laws that embrace uncertainty and the potential for unforeseeable surprises.

**6pm – 7pm, GLC Multipurpose Room**

## Symposium Session 1

9am-10am

### Room A

*Saif Tarek Abdelrasol*

GEN Z IS CHANGING THE GAME: YOUTH TURNOUT IN THE 2022 U.S. MIDTERM ELECTIONS

*Dhritiman Barman (Graduate Student in Science, Technology, and Society)*

CONTENTIOUS STRATEGIC ACTION FIELD: THE SHAPING AND RESHAPING OF THE LEGAL CANNABIS MARKET IN SOUTHWEST VIRGINIA

*Nabin Bhatta (Graduate Student in...)*

NOT WEIRD ENOUGH: HIGHER-ORDER INTERFERENCE IN GENERALIZATIONS OF QUANTUM MECHANICS

### Room B

*Nandini Das*

IMPACTS OF FINANCIAL LITERACY TRAINING ON REFUGEE YOUTH OUTCOMES: EVIDENCE FROM UGANDA

*Dylan C. Easley*

TREATMENT DURATION AND LOAD MAGNITUDE DIFFERENTIALLY AFFECT BIOMECHANICAL PROPERTIES IN A PRECLINICAL MODEL OF ACHILLES TENDINOPATHY

*Earl Gilbert*

T-DOPE: USING A NOVEL DEVICE TO STUDY CANNABINOID SIGNALING IN THE HIPPOCAMPUS

### Room C

*Upali Bhattcharya*

DIGITAL TECHNOLOGY AND EDUCATION IN INDIA: INEQUITABLE ACCESS AND OUTCOMES

*Doyee Byun*

ACTIVE GALAXIES AND OUTFLOWING GASES: ANALYSIS OF THE QUASAR B0254-3327B

*Promit K. Chaudhuri*

GAMES UNDER NETWORK UNCERTAINTY

**Flash Talk Session 1**  
**9am-10am**

**Room D**

*Kamala Al Amri*

CULTURAL DIVERSITY IN INSTRUCTIONAL DESIGN

*Camille Block*

IDENTIFYING POTENTIAL RDL INSECTICIDE RESISTANCE MUTATIONS ACROSS  
TEMPORAL SCALES IN THE COMMON BED BUG, CIMEX LECTULARIUS

*Neeti Gandhi*

INVESTIGATING MATURATION OF HEPATOCYTE-LIKE CELLS IN A 3D LIVER  
ORGANOID BY INTERCELLULAR SIGNALING

*Jonathan Gendron*

HOW TO MODEL A META ANALYSIS WITH MINIMAL ASSUMPTIONS

*James May*

CHARACTERIZING THE GLIOBLASTOMA "ABLATOSOME" AFTER TREATMENT WITH  
HFIRE

*Elham Nasarian*

DESIGNING ROBUST INTERPRETABLE ML SYSTEM TO ENHANCE TRUSTWORTHY AI  
IN HEALTHCARE

*Isabel Valdivia*

ASSOCIATIONS AMONG THE HOME MATH ENVIRONMENT, HOME EXECUTIVE  
FUNCTION ENVIRONMENT, AND YOUNG CHILDREN'S MATH AND EXECUTIVE  
FUNCTION SKILLS

**Poster Session 1**  
**Multipurpose Room**  
**10am-11am**

*Abdallah Abdelsattar*

REPURPOSING VALNEMULIN FOR COMBATING MULTIDRUG-RESISTANT  
NEISSERIA GONORRHOEAE

*Ahmed Abouelkhair*

REVEALING IONOMYCIN AS A POTENT ANTICLOSTRIDIAL AGENT WITH DISTINCT  
MECHANISM OF ACTION

*Prashasti Agarwal*

PLANT FUNCTIONAL TRAITS DRIVE SOIL MICROBIAL DIVERSITY

*Rashed Alarrak*

MECHANICAL PERFORMANCE OF EXTRUDED FUNCTIONALLY GRADED FIBER-  
REINFORCED MORTAR WITH TARGETED FIBER INJECTION

*Hoda Alemrajabi*

INTEGRATING NATURE INTO NORMS: EVALUATING BIOPHILIC DESIGN ATTRIBUTES  
IN BUILDING RATING SYSTEMS

*Mariama Alidu*

EFFECT OF DISPERSION ON RHEOLOGY AND 3D PRINTING OF CHITOSAN-  
GRAPHENE-TITANIUM DIOXIDE COMPOSITES

*Nour Alkashef*

PIMVANSERINE, A PROMISING ADJUVANT TO FLUCONAZOLE MONOTHERAPY  
AGAINST CRYPTOCOCCOSIS

*Mubarak Alrumaidhi*

COMPARATIVE ANALYSIS OF PARAMETRIC AND NON-PARAMETRIC DATA-DRIVEN  
MODELS TO PREDICT ROAD CRASH SEVERITY AMONG ELDERLY DRIVERS USING  
SYNTHETIC RESAMPLING TECHNIQUES

*Zeynep Ambarkutuk*

RELATIONSHIPS BETWEEN STUDENTS' PERCEPTIONS OF MOTIVATIONAL CLIMATE  
AND THEIR MOTIVATION IN AN UNDERGRADUATE COURSE: A MUSIC MODEL  
PERSPECTIVE

*Nazia Bano*

INTEGRIN EXPRESSION SWITCHING DURING OVARIAN CANCER PROGRESSION

*Olaitan Bobade*

ACUTE IMPACT OF NON-NUTRITIVE SWEETENERS (SUCRALOSE AND ASPARTAME)  
ON GLYCEMIA

*Jordan Boone*

NON-NUTRITIVE SWEETENER CONSUMPTION AND GLYCEMIC CONTROL IN  
MIDDLE-AGED AND OLDER ADULTS WITH PREDIABETES: BACKGROUND, DESIGN,  
AND METHODS OF A CONTROLLED FEEDING TRIAL

*Olyvia S. Brown-Coles*

CHALLENGES ON TWO FRONTS: ADMINISTRATIVE DISCRETION AND EQUITABLE  
ACCESS TO PUBLIC-PRIVATE HOUSING

*Thomas Byrne*

A FRAMEWORK FOR MODELING MICROBIAL ECOLOGICAL ALTERATIONS OF THE  
RESISTOME IN THE SEWERSHED

*Rose Campbell*

ISOLATION AND CHARACTERIZATION OF A NOVEL MARINE LIPOPEPTIDE

*Vanessa Paola Diaz Benitez*

NEGATIVE AFFECTIVITY PREDICTS WORSE EXECUTIVE FUNCTIONS IN  
ADOLESCENCE: EXPLORING THE MEDIATING ROLE OF EMOTION REGULATION

*Yehia Elgammal*

EVALUATION OF THE COMBINATIONAL THERAPY OF ATAZANAVIR AND  
SAQUINAVIR WITH AZOLE ANTIFUNGALS AGAINST CANDIDA AURIS

*Parisa Farzeen*

ATOMISTIC INSIGHTS INTO THE SOLUBILITY OF  $\alpha$ -GLUCANS IN WATER

*Brittany Heath*

CHARACTERIZATION OF STING'S ROLE IN VENEZUELAN EQUINE ENCEPHALITIS  
VIRUS (VEEV) INFECTION

*Lauren Helber*

POTENTIAL FOR A NEW SUPPLEMENTAL DIAGNOSTIC ASSAY TO IDENTIFY HORSES  
WITH EQUINE PROTOZOAL MYELOENCEPHALITIS (EPM)

*Md Sifat Hossain*

ENHANCING FE-MO INTERACTIONS USING  $\text{Fe}_2(\text{MOO}_4)_3/\text{HZSM-5}$  CATALYSTS IN  
NON-OXIDATIVE METHANE DEHYDROAROMATIZATION

*Aubrey Johnson*

DESIGNING LIQUID METAL MICROSTRUCTURES THROUGH DIRECT INK WRITING

*Tom Kasputis*

ON-SITE FLUORESCENT DETECTION OF SEPSIS-INDUCING BACTERIA USING A  
GRAPHENE-OXIDE CRISPR-CAS12A (GO-CRISPR) SYSTEM

*Ishveen Kaur*

TRANSCRIPTOME-BASED IDENTIFICATION AND FUNCTIONAL CHARACTERIZATION  
OF GERANIOL SYNTHASE INVOLVED IN MONOTROPEIN BIOSYNTHESIS IN  
BLUEBERRY

*Elisabeth Kitchin*

PIXELS TO PATHOGENS: UTILIZING MACHINE LEARNING FOR TURFGRASS  
DISEASE DETECTION AND QUANTIFICATION

*Merly Konathapally*

EVALUATION OF COMMUNITY-BASED INTERVENTIONS TO ESTABLISH LINKAGE-  
TO-CARE AMONG PATIENTS WITH HCV INFECTION

*Lois Kyei*

DISCOVERY OF BIOFILM INHIBITORS FROM MARINE EGG MASS MICROBIOTA

*Kacy Lawrence*

A MULTILEVEL ANALYSIS TO EXAMINE INTERDISCIPLINARY RESEARCH  
EXPERIENCE AMONG DOCTORAL GRADUATES AND ITS EFFECT ON CAREER  
OUTCOME

*Mingsi Liao*

DIETARY CRUDE PROTEIN IS INDEPENDENT OF RUMEN MICROBIAL COMMUNITY  
ECOLOGY IN LACTATING DAIRY COWS

*Rebecca Mammel*

NOX4 DRIVES EXERCISE-INDUCED MITOPHAGY

*Tyler Parker-Rollins*

PSYCHOLOGICAL SAFETY IN UNIVERSITY CLASSES: FACTORS DETERMINING  
PERCEPTIONS OF PERSONAL ENGAGEMENT IN THE CLASSROOM

*Kaitlyn C. Rasnick*

PREDICTORS OF MATERNAL NEGATIVE SELF-EXPRESSIVENESS IN THE FAMILY  
CONTEXT



## **Symposium Session 2**

**11am-12pm**

### **Room A**

*Ying-Xian Goh*

A NATIONWIDE INVESTIGATION OF ANTIBIOTIC RESISTANCE GENES IN SOIL-DWELLING LISTERIA

*Lindsay Johnson*

WHERE'S THE BEE? CALIBRATING AND VALIDATING A NEW METHOD OF ESTIMATING HONEY BEE FORAGING FLIGHT DISTANCES

*Sydney Johnson*

MECHANISM OF NITRO-FORMATION BY A FLAVIN-DEPENDENT N-HYDROXYLASE: CreE

### **Room B**

*Yulun Li*

FANTASTIC PARTICLES AND WHERE TO FIND THEM

*Alexandra Longest*

AIRBORNE TRANSMISSION OF VIRUSES: IMPACT OF GAS COMPOSITION AND HUMIDITY

*Esther Oyedele*

ASSESSING COLORADO RIVER BASIN GROUNDWATER STORAGE CHANGES DURING RECENT DROUGHT: IMPLICATIONS FOR EFFECTIVE WATER MANAGEMENT

### **Room C**

*Kaylee Diana Petraccione*

RIFT VALLEY FEVER VIRUS NSS PROTEIN INTERACTS WITH LC3 FAMILY MEMBERS TO INHIBIT AUTOPHAGY

*Leonard-Allen Quaye*

EXPLORING THE DYNAMICS OF FOOD COMMODITY PRICES AND WEATHER ANOMALIES USING A STAR MODEL

*Emma Rice*

UNDERSTANDING THE DIVERSE BENEFITS AND RISKS OF ACCESSING THE DETROIT RIVER: A FOOD SYSTEMS PERSPECTIVE FROM SHORE-BASED FISHERS IN DETROIT, MICHIGAN

**Flash Talk Session 2**  
**11am-12pm**

**Room D**

*Evangelos Piliouras*

THE ART OF QUANTUM CONTROL

*Rahmatullah Roche*

E(3)-EQUIVARIANT GRAPH NEURAL NETWORKS FOR PROTEIN-PROTEIN  
INTERACTION SITE PREDICTION

*Elizabeth Sicking*

UNCERTAIN WATERS AHEAD: UNDERSTANDING INVERTEBRATE COMMUNITY  
PATTERNS IN GEOGRAPHICALLY ISOLATED WETLANDS

*Kelley Sinning*

HEALTHY HEADWATERS: USING SECONDARY PRODUCTION TO EVALUATE  
MACROINVERTEBRATE COMMUNITY COMPOSITION SHIFTS IN THE CENTRAL  
APPALACHIAN COALFIELDS

*William Taylor Jr.*

ENGAGING SECONDARY TEACHERS IN CALS RESEARCH FOR AGRICULTURAL  
LITERACY

*Shadi Ariyanfar*

CO-LOCALIZATION PATTERN OF SNHG14 LONG NONCODING RNA AND NHLH2  
MRNA IN THE HYPOTHALAMUS COINCIDES WITH OBESITY AND ENDOCRINE  
IMPAIRMENT PHENOTYPES IN PRADER-WILLI SYNDROME

**Poster Session 2**  
**Multipurpose Room**  
**1pm-2pm**

*Mia Riddley*

DISENTANGLING ECOLOGICAL DRIVERS CONTROLLING DIVERSITY AND  
COMMUNITY ASSEMBLY OF THE SOIL MICROBIOME

*Juan R. Romero Cubas*

RADIANT HEAT, HOT WATER, AND ORGANIC CHEMICALS CONTROL ANNUAL  
BLUEGRASS IN DORMANT TURF

*Erica Shafer (Graduate Student in Psychology)*

HOW DOES CONTEXT VARIABILITY INTERACT WITH ENCODING-RETRIEVAL  
MATCH?

*Brice Stolz*

DISCOVERY OF POTENT ANTICLOSTRIDIAL COMPOUNDS THROUGH SCREENING  
AN ANTIVIRAL LIBRARY

*Morgen VanderGiessen*

COMPARATIVE ANALYSIS OF EQUINE ENCEPHALITIS VIRUSES (EEV), TRAUMATIC  
BRAIN INJURIES (TBI), AND ORGANOPHOSPHORUS NERVE AGENTS (OPNA) AS A  
PATH TO NEUROPROTECTIVE THERAPEUTICS

*Cheyenne A. Williams*

PREDICTIVE FACTORS OF SOCIAL PROBLEMS IN MIDDLE CHILDHOOD: CEILING  
EFFECTS OF MATERNAL INTERACTION

*Saadia Ali*

CREATE INNOVATE COLLABORATE/ EMPOWERING STUDENTS THROUGH OPEN  
TEXTBOOK COLLABORATION/ CONTENT AREA LANGUAGE & LITERACY

*Evan Alvarez*

NATURALISTIC OBSERVATIONS OF INTERPERSONAL GRATITUDE: RELATIVE  
IMPACT OF MODELING VS. DIFFUSION OF RESPONSIBILITY

*Karina Daniel*

PRACTICAL INTERVENTIONS TO DECREASE THE USE OF PLASTIC BAGS;  
BEHAVIORAL OBSERVATIONS AT TWO LARGE GROCERY STORES

*Maximo de Leon*

EXAMINING THE U.S. TREASURY VOLATILITY DYNAMICS: A DCC-MIDAS  
APPROACH

*Rana Estaleen*

SLEuthing THE MICROBIOME: CX3CR1 AND GUT MICROBIOTA MODULATIONS IN  
SLE

*Rafaela Flor*

CHARACTERIZATION OF RIFT VALLEY FEVER VIRUS L POLYMERASE INTERACTION  
WITH PROTEIN PHOSPHATASE-1 ALPHA

*Timothy Franck*

PHYSICS INFORMED MACHINE LEARNING FOR TRIGA REACTOR CONTROL

*Cole Friedman*

MEASURING FIDELITY OF A MOLTEN SALT FISSION MATRIX NEUTRONICS CODE  
THROUGH A COMPARISON WITH SERPENT

*Fatemeh Ghafouri*

OPTIMAL ATOMIC RADII FOR PROTEIN-LIGAND BINDING CALCULATIONS IN THE  
IMPLICIT SOLVENT

*Inga Haugen*

HOW MIGHT A BUREAUCRATIC INFORMATION SYSTEM (BIS) PROVIDE  
LEADERSHIP FOR AN ORGANIZATION?

*Daisy Hernandez-Ramos*

SENDING LOVE: EFFECTS OF WRITING A POSITIVE MESSAGE ON SUBJECTIVE  
WELL-BEING

*Ohnyoung Hur*

DESIGNING LIQUID METAL MICROSTRUCTURES THROUGH DIRECT INK WRITING

*John Joyce*

RAPID AND REVERSIBLE MORPHING TO ENABLE MULTIFUNCTIONALITY IN  
ROBOTS

*Antarjot Kaur*

UNDERSTANDING LATINA COMPUTING IDENTITY DEVELOPMENT AT A HISPANIC-  
SERVING COMMUNITY COLLEGE

*Babatomiswa Kikiowo*

NITROXOLINE'S IMPACT ON COMBATING NEISSERIA GONORRHOEAE  
INFECTIONS

*Yeunhee Kim*

VERSATILE RIGID-SOFT GRIPPER WITH ACTIVE MEMBRANE SWITCHABLE  
ADHESIVES

*Chanhong Lee*

METAMATERIAL ADHESIVES FOR PROGRAMMABLE ADHESION THROUGH  
REVERSE CRACK PROPAGATION

*Hilary Montano*

DISSECTING THE ROLE OF NF-KB INDUCING KINASE AS A POSSIBLE THERAPEUTIC  
TARGET FOR SYSTEMIC LUPUS ERYTHEMATOSUS

*Isabel Motil*

PERCEIVING EMOTIONS UNDER STRESS AND GRATITUDE CONDITIONS: IMPACT  
OF GRATITUDE ON PERCEIVING POSITIVITY

*Mahima Prajapati*

AEROELASTIC FLUTTER ANALYSIS WITH MULTIPLE MASSES ON THE WING:  
UNRAVELING DYNAMIC INTERACTIONS

*Ivan Savelyve (Undergraduate Student in)*

PERSONAL IDENTITY INFLUENCE ON THE PERCEPTION OF MISOGYNY IN SOCIAL  
MEDIA

*Anastasia Semenova (Undergraduate Student in)*

A STUDENT-TO-TEACHER “THANK YOU”: EFFECTS OF EXPRESSING GRATITUDE ON  
SUBJECTIVE WELL-BEING

*Nadyezhda Taylor*

FLOURISHING AND ACADEMIC PERFORMANCE: INVESTIGATING SELIGMAN’S  
PERMA MODEL IN RELATIONSHIP TO ACADEMIC PERFORMANCE

*Adam Tyler*

ANALYZING THE COMPLEXITY OF BAT FLIGHT TO INSPIRE THE DESIGN OF  
FLAPPING ROBOTS

*Amanda Wei*

INCREASING BINDER JETTING PART DENSITY AND STRENGTH THROUGH INFILL  
TOOLPATH DESIGN

*Kylie Wijeratne*

OVER RESPONSIVITY TO MOVEMENT AND VISUAL/AUDITORY STIMULI AT 3 AND  
HOW IT ASSOCIATES WITH FEAR AT AGES 2,3, AND 4: A CORRELATION STUDY

*Adam Hinson*

CONTROLLING SOFT ROBOTIC BAT PINNA WITH DEEP REINFORCEMENT  
LEARNING

## **Symposium Session 3**

### **2pm-3pm**

#### **Room A**

*Julia Shapiro*

COMMUNICATING IN NETWORKS WITH ADVERSARIES

*Alyssa Rosenbaum*

SURVIVAL OF GENERIC ESCHERICHIA COLI ON PLASTIC MULCH HELD IN  
DIFFERENT GROWING ENVIRONMENTS

*Julia Unger*

TO KNOW OTHERS IS TO LOVE THEM: COALITION-BUILDING AND CHRISTIAN  
RELATIONSHIP IN "DEAR FEMINIST MORMON HOUSEWIFE"

#### **Room B**

*Ravi Yadav*

TIMELINE OF HEPATIC STEATOSIS AND METABOLIC ADAPTATIONS IN NEONATAL  
PIGS FED FORMULAS RICH IN MEDIUM-CHAIN FATTY ACIDS

*Tianming Zhao*

UNPACKING THE UNCANNY 'INTERLOPER' OF NARRATIVE PERSPECTIVE IN  
SHIXUE

*Muhummad Awfa Islam*

EXPLORING THE IMPACT OF HUMANITARIAN CRISIS ON HOST COMMUNITIES: A  
CASE STUDY ON THE SELECTED HOST COMMUNITIES IN COX'S BAZAAR,  
BANGLADESH

#### **Room C**

*Deepak Kumar*

ASSESSING TYPHOON IMPACT ON LOCAL ECONOMY: AN ANALYSIS OF NEW  
NIGHT-LIGHT AND HOUSEHOLD-LEVEL ELECTRICITY DATA

*Abdullahi Jamiu*

LEVERAGING VIRUS-HOST INTERACTIONS TO DEVELOP NOVEL INHIBITORS  
AGAINST VENEZUELAN EQUINE ENCEPHALITIS VIRUS

*Bala Priya Shanmugam*

A PERIDYNAMIC APPROACH TO MICROMETEOROID DAMAGE DETECTION IN  
LUNAR STRUCTURES

**Flash Talk Session 3**  
**2pm-3pm**

**Room D**

*Gayoung Ban*

UNDERSTANDING THE IMPACT OF NON-DRIVING TASKS ON DRIVER RESPONSES  
TO CYBER-ATTACKS IN CONNECTED AND AUTOMATED VEHICLES

*Ahmed Elashwah*

A NOVEL GRANULAR COMPOSITE WITH ADJUSTABLE STIFFNESS UTILIZING  
PNEUMATICS

*Harrison Miles*

A REVIEW OF BIOLOGICAL CONTROL FOR THE INVASIVE TREE-OF-HEAVEN,  
AILANTHUS ALTISSIMA

*Nicole Stark*

SURFACE FRICTION IMPLICATIONS FOR SNOWSPORT HELMETS

*Ella Williams*

LIQUID METAL-ELASTOMER COMPOSITES FOR WATER-RESILIENT SOFT  
ELECTRONICS

## **Symposium Session 4**

**3pm-4pm**

### **Room A**

*Delshad Shroff*

EXAMINATION OF EMOTION SOCIALIZATION IN EARLY CHILDHOOD: INDIAN VS.  
U.S. WHITE FAMILIES

*Qian Wang*

SUPRAMOLECULAR METAL HALIDE COMPLEXES FOR HIGH-TEMPERATURE  
NONLINEAR OPTICAL SWITCHES

*Brittan Wilcox*

ADHESION OF LIQUID METAL COMPOSITES FOR NEXT-GENERATION SOFT  
ELECTRONICS