Joseph A. Makowski

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Education

Duquesne University **Aug. 2021 – Dec. 2025**
Doctor of Philosophy, Chemistry Pittsburgh, Pennsylvania

- Certificate of University Teaching (anticipated 2025)

Bethany College **Sep. 2017 – May 2021**
Bachelor of Science, Chemistry Bethany, West Virginia

- Minor in Mathematics
- Minor in Theoretical Physics
- GPA: 3.750/4.000

Coursework Highlights

- Machine Learning
- Statistical Computing
- Numerical Analysis
- Nonlinear Dynamics and Chaos
- Simulation Methods
- Algebra/Analysis/Topology
- Protein–Nucleic Acid Interactions
- Graph Theory and Algorithms
- Cheminformatics

Graduate Research Experience

Duquesne University, Evanseck Research Group

Ph.D. Research **Aug. 2021 – Dec. 2025**

Advisor: Prof. Jeffrey Evanseck

- Characterized RNA–RNA conformational interconversion using chain-of-states transition pathway methods and free-energy calculations, defining atomistic intermediates relevant to RNA genome dimerization.
- Used Bayesian Maximum Entropy (BME) reweighting to integrate MD trajectories with NMR observables, enabling statistically rigorous refinement of RNA conformational ensembles and quantitative evaluation of model–experiment agreement.
- Investigated the structural dynamics and homodimerization propensity of the SARS-CoV and SARS-CoV-2 s2m element using MD simulations, dimensionality reduction, and unsupervised learning to identify dominant substates.

Publications

‡ Shared first authorship

7. Matzel, T.‡;**Makowski, J.**‡; Kensinger, A.; Oxenfarth, A.; Wirtz Martin, M.; Evanseck, J.; Schwalbe, H. Integrated NMR and MD structure and dynamics of the stem loop II motif (s2m) from the Omicron variant of SARS-CoV-2. *RNA* (**2025**) DOI: 10.1261/rna.080576.125
6. Wirtz Martin, M.‡; **Makowski, J.**‡; Matzel, T.; Kensinger, A.; Herr, A.; Wacker, A.; Richter, C.; Jonker, H.; Evanseck, J.; Schwalbe, H. Structural heterogeneity and dynamics in the apical stem loop of s2m from SARS-CoV-2 Delta by an integrative NMR spectroscopy and MD simulation approach. *Nucleic Acids Research* (**2025**) DOI: 10.1093/nar/gkaf552
5. Kensinger, A.; **Makowski, J**.; Mihailescu, M.; Evanseck, J. Structural Prediction of Coronavirus s2m Kissing Complexes and Extended Duplexes. *ACS Physical Chemistry Au* (**2025**) DOI: 10.1021/acsphyschemau.5c00031
4. **Makowski, J**.‡; Kensinger, A.‡; Cunningham, C.; Frye, C.; Lackey, P.; Mihailescu, M.; Evanseck, J. Delta SARS-CoV-2 s2m Structure, Dynamics, and Entropy: Consequences of the G15U Mutation. *ACS Physical Chemistry Au* (**2023**) DOI: 10.1021/acsphyschemau.3c00008
3. Cunningham, C.; Frye, C.; **Makowski, J**.; Kensinger, A.; Shine, M.; Milback, E.; Lackey, P.; Evanseck, J.; Mihailescu, M. Effect of the Delta-associated G15U mutation in the s2m element of SARS-CoV-2 on its dimerization and host microRNA interactions. *RNA* (**2023**) DOI: 10.1261/rna.079627.123
2. Kensinger, A.‡; **Makowski, J.**‡; Pellegrene, K.‡; Imperatore, J.; Cunningham, C.; Frye, C.; Lackey, P.; Mihailescu, M.; Evanseck, J. Structural, Dynamical, and Entropic Differences between SARS-CoV and SARS-CoV-2 s2m Elements Using Molecular Dynamics Simulations. *ACS Physical Chemistry Au* (**2022**). DOI: 10.1021/acsphyschemau.2c00032

1. Frye, C.; Shine, M.; **Makowski, J.**; Kensinger, A.; Cunningham, C.; Milback, E.; Evanseck, J.; Lackey, P.; Mihailescu, M. Bioinformatics Analysis of the s2m Mutations within the SARS-CoV-2 Omicron Lineages. *Journal of Medical Virology* (**2022**). DOI: 10.1002/jmv.28141.

Preprints and Manuscripts in Preparation

‡Shared first authorship *Corresponding author

- **Makowski, J.**; Kensinger, A.; Mihailescu, M.; Evanseck, J. HIV-1 DIS Atomistic Transition Pathway from Kissing Complex to Extended Duplex. Manuscript in preparation.
- Yenireddy, S.; **Makowski, J.*** Structural and Dynamic Differences Between HIV-1 and HIV-2 Tat–TAR Complexes: Implications for Dual Infection and Therapeutic Targeting. Manuscript in preparation.
- Vernier, B.‡; **Makowski, J.‡**; Fox, D.; Kensinger, A.; Kotsikorou, E.; Montgomery, T.; Tamez, A.; Evanseck, J. Integration of Computation and Experimental Chemistry in an Undergraduate Summer Research Program. Manuscript in preparation.

Grants

RNA Homodimerization Strand Displacement Pathways to Extended Duplexes: Atomistic Details for a Mechanistic Paradigm to Identify Unique Antiviral Targets for Current and Emerging Viral Pandemics

- **Agency:** NIH NIAID (R15)
- **Role:** Primary writer and co-developer of project aims; drafted full research narrative, strategy, specific aims, and significance under supervision of PI (Jeffrey Evanseck)
- **Status:** Awarded (Impact score 20; total funding $507,121)

Structural and Dynamical Features of HIV DIS Dimerization for Genome Packaging: Atomistic Pathways of 5′-Leader Sequestration and Strand Displacement

- **Agency:** NIH CRNA (Collaborative Development Program)
- **Role:** Lead author; developed computational methodology and authored scientific plan under supervision of PI (Jeffrey Evanseck)
- **Status:** In review

Honors and Awards

2025	Highest Impact Factor Publication Award, Duquesne University.
2025	Bayer Fellowship, Duquesne University.
2024	Highest Impact Factor Publication Award, Duquesne University.
2024	"Above and Beyond" Teaching Assistant Award, Duquesne University.
2021	J.S.V. Allen Memorial Prize in Physics, Bethany College.
2020	NSF REU, Duquesne University.
2020	Inducted into Gamma Sigma Epsilon (Chemistry Honor Society).
2019	John F. Conn Poster Award, Gamma Sigma Epsilon Biennial Convention.
2019	NSF REU, Duquesne University.
2018–2019	WV NASA Space Grant Fellowship.
2018	Inducted into Kappa Mu Epsilon (Mathematics Honor Society).
2017–2021	Music Scholarship, Bethany College.

Technical Skills

Computational Methods: Molecular dynamics simulations; enhanced sampling and free-energy methods; quantum chemistry (HF, MP2/MPn, DFT, CC); multivariate statistics; machine learning (supervised/unsupervised); Markov state models; Bayesian parameter estimation and uncertainty quantification; likelihood-free inference and Approximate Bayesian Computation (ABC); Markov chain Monte Carlo (MH, Gibbs, HMC/NUTS); chain-of-states methods (NEB, GSM); topological data analysis (persistent homology); foundational bioinformatics; high-performance computing.

Libraries: `numpy`, `scipy`, `scikit-learn`, `pandas`, `matplotlib`, `mdtraj`, `pytraj`, `OpenMM`, `ripser`, `persim`, `networkx`, `deeptime`, `Biostrings`, `DECIPHER`, `BiocManager`, `adegenet`, `stringr`, `ape`, `BLAS`, `LAPACK`.

Technologies & Software: GNU/Linux (HPC environments), SLURM, Gaussian 16, GaussView, NAMD, AmberTools, CHARMM, VMD (Tcl/Tk scripting), bash, make, Jupyter, conda/venv, basic familiarity with OpenMP and CUDA.

Programming Languages: Python, Fortran, R, Tcl/Tk, Mathematica, MATLAB/Octave, LaTeX.

Mathematical Background: Functional analysis, operator theory, measure theory, dynamical systems and chaos, statistical mechanics, algebraic topology, numerical analysis, optimization.

Scientific Computing and Method Development

JOEMAKS (Molecular Dynamics Analysis Suite)

Developed a toolkit for MD trajectory analysis supporting dimensionality reduction, clustering, entropy/free-energy estimation, and statistical characterization of conformational ensembles.

Built a unified command-line interface and configuration-driven workflow for automated processing and visualization.

Implemented in Python using `numpy`, `pandas`, `scikit-learn`, `mdtraj`, and `matplotlib`; some low-level routines written in Fortran for performance.

Sole developer; used in at least four peer-reviewed publications, over a dozen posters, and several manuscripts in preparation.

RNA Homology (Persistent Homology Analysis Pipeline)

Created a Python pipeline for topological data analysis of biomolecular structures, computing Vietoris–Rips filtrations, persistence diagrams, and persistence images for downstream supervised machine-learning tasks.

Integrated statistical and ML components using `numpy`, `scikit-learn`, `mdtraj`, `ripser`, and `persim`.

Designed auxiliary Tcl/VMD scripts for visualizing the 1- and 2-skeleton simplicial complexes over molecules.

Sole developer; enabled large-scale analysis of all RNA structures in the PDB, identifying topological signatures distinguishing RNA from proteins (unpublished).

SARS-CoV-2 3'-UTR Bioinformatics

Developed R scripts for large-scale FASTA processing to track mutations in SARS-CoV-2 UTR regions, classify sequence variants, and compute temporal mutation statistics.

Implemented using `Biostrings`, `DECIPHER`, `adegenet`, `stringr`, `ape`, and related Bioconductor workflows.

Contributed to core functionality and optimized data automation, enabling analysis sufficient for publication.

Used in at least two peer-reviewed publications and multiple conference posters.

Post-Secondary Teaching Experience

Duquesne University, Dept. Chemistry and Biochemistry *Pittsburgh, PA*

Instructor **2025**
CHEM 211: Organic Chemistry I (Summer 2025)

One section; organic chemistry lecture course for non-chemistry science majors; responsible for teaching IR and mass spectroscopy as well as cumulative review of semester content.

Instructor **2021 – 2025**
CHEM 229L: Synthesis and Spectroscopy Lab (Spring 2025, Spring 2024)
CHEM 228L: Structure, Mechanism, and Reactions Lab (Fall 2023, Fall 2022)

One section per semester; chemistry majors; delivered prelabs, wrote quizzes, and supervised experiments.

CHEM 211L: Organic Chemistry I Lab (Fall 2023, Fall 2022, Fall 2021)
CHEM 212L: Organic Chemistry II Lab (Spring 2025, Spring 2024, Summer 2023, Spring 2023, Summer 2022, Spring 2022)

One or two sections per semester; non-chemistry science majors; delivered prelabs and supervised experiments; provided mentorship/orientation for less experienced instructors or adjuncts.

Instructor **2024**
CHEM 426L: Advanced Experimental Techniques and Applications (Fall 2024)

One section; senior chemistry major capstone course; delivered lab and recitation for the physical chemistry module of the course.

Teaching Assistant **2024**
CHEM 401: Biochemistry (Fall 2024)

One section; non-chemistry science majors; assisted grading weekly homework and midterm exams.

Bethany College, Dept. Physical and Computational Science *Bethany, WV*

(Volunteer) Teaching Assistant **2020**
PHYS 202: General Physics II (Spring 2020)

One section; calculus-based electricity and magnetism for science majors; following COVID-19 lockdowns, delivered three hours of supplementary tutoring/lecture per week over Zoom according to guidelines specified by the professor; answered student questions and clarified course content.

Teaching Assistant **2019**
BFYE 101: Game, Set, Match - Economic Thinking in Board Game Design (Fall 2019)

One section; freshman seminar; assisted professor by answering student questions in lecture during hands-on board game design projects.

Mentoring

Duquesne University, Evanseck Research Group
NSF REU in Chemistry **Summers 2022 – 2025**

- **Technical Workshops** Created and delivered four seminars/technical workshops: using Visual Molecular Dynamics software for research (2022 – 2024); an introduction to Python for research, modeling, and diverse tasks in chemistry and beyond (2023, 2024); principles and basic implementation of AI and machine learning for research (2024); and chain of states modeling (2025)
- (2025) Mentored two undergraduates and three graduate students: one undergraduate in chain-of-states modeling of biomolecular transition pathways, another in RNA dynamics, and each of the three graduate students in RNA structure and dynamics studies, guiding them on how to advise their own undergraduate students.
- (2024) Mentored two undergraduates: one in performing quantum chemical geometry optimizations, reaction pathway calculations, and NBO analysis to explain different activation energies between two mechanically activated retro Diels-Alder reactions; the other in performing molecular dynamics simulations and subsequent data analysis methods to study competitive inhibition of an enzyme
- (2023) Mentored one undergraduate in performing quantum chemical geometry optimizations and coordinate scans, growing string transition pathway computations, and NBO analyses to characterize the physical consequences of applying mechanical force to drive a retro Diels-Alder reaction
- (2022) Assisted four undergraduates with various quantum mechanics calculations, molecular dynamics simulations, data analysis, or using high performance computing environments for their projects

Duquesne University URP Ethics Forum **Summer 2021**

- Mentored five undergraduates in scientific ethics; students independently researched journal article piracy as a case study while I provided instruction on both professional/academic best practices and some common philosophical frameworks for moral behavior

Academic Tutoring

Math and Science Tutoring *Remote*
Founder and Head Tutor **2021 – Present**

- Provided sustained one-on-one instruction to middle school, high school, and undergraduate students across mathematics, chemistry, physics, and related quantitative subjects, including multiple long-term students that have retained my services continuously for years.
- Designed individualized enrichment lessons, diagnostics, and problem sets to strengthen conceptual understanding, support independent learning, and reinforce or supplement school and university curricula.
- Supported students across a broad range of coursework, including Algebra through Calculus and Linear Algebra; AP Chemistry and AP Physics; introductory and intermediate college-level mathematics; scientific writing; and foundational research skills.
- Observed consistently strong academic outcomes, including substantial grade improvement, exceptional performance on standardized exams, early mastery of advanced STEM material, admission to competitive high schools and colleges, qualification for selective science fairs, development of research projects suitable for scholarly dissemination, or successful application of skills to valuable commercial or entrepreneurial ventures.

Bethany College, Dept. Physical and Computational Science *Bethany, WV*
Chemistry, Mathematics, and Physics Peer Tutor **2018 – 2021**

- Tutored ca. 200 students in any topic in chemistry, math, or physics familiar to me on-demand
- General, Organic, and Analytical Chemistry
- College Algebra, Calculus, Differential Equations, Intro to Proofs, Linear Algebra, Abstract Algebra, Analysis, Topology
- Mathematical Methods in Physics, Mechanics, Electricity and Magnetism
- Mathematica, R, LaTeX, programming basics

Work Experience

Rebel Labs, Inc. *Remote*
Founding Technical Lead **Nov. 2025 – Present**

- Designed early-stage technical architecture, ML workflows, and data-processing pipelines for an AI/ML platform aimed at accelerating computational chemistry.
- Led prototype development cycles; advised on algorithm design, model development, and data infrastructure across pre-seed R&D efforts.
- Provided strategic technical guidance that supported pre-seed fundraising and shaped long-term feasibility assessments.

Undergraduate Research Experience

Duquesne University, Evanseck Research Group *Pittsburgh, PA*
NSF REU in Chemistry **Summer 2019, 2020**

- (2020) Identified noncovalent interactions in reaction transition structures and employed kinetic theory to elucidate the physical underpinnings of previously unexplained stereoselective C-glycosylation reactions proceeding through ring oxocarbenium ions
- (2019) Investigated the role of solvent on Corey formyl hydrogen bond formation in several Lewis acid-base complexes, laying the foundation for asymmetric catalysis leveraging these interactions

Bethany College, Dept. Physical and Computational Science *Bethany, WV*
Undergraduate Thesis **Defended May 2021**

- Title: "A stereochemical model for nucleophilic additions to ring oxocarbenium ions"

WV NASA Undergraduate Research Fellowship **Spring 2019**
Advisor: Prof. Scott Brothers

- Measured the efficacy of various natural products as reducing agents for "green" synthesis of silver nanoparticles by UV-vis spectroscopy; observed qualitative trends in diameter and yield of synthesized nanoparticles as a function of polyphenol content of cataloged natural products

References

Prof. Jeffrey Evanseck
Department of Chemistry and Biochemistry and Center for Computational Sciences, Duquesne University
Email: evanseck@duq.edu
Phone: (412) 396-6337

Prof. Harald Schwalbe
Center for Biomolecular Magnetic Resonance, Goethe University Frankfurt
Email: schwalbe@nmr.uni-frankfurt.de
Phone: +49 (69) 798-29737

Prof. Mihaela-Rita Mihailescu
Department of Chemistry and Biochemistry, Duquesne University
Email: mihailescum@duq.edu
Phone: (412) 396-1430

Presentations

Contributed Talks

- **Makowski, J.**; Wirtz Martin, M.; Matzel, T.; Kensinger, A.; Herr, A.; Wacker, A.; Richter, C.; Jonker, H.; Evanseck, J.; Schwalbe, H. (**July 2025**) "Structural heterogeneity and dynamics in the apical stem loop of s2m from SARS-CoV-2 Delta by an integrative NMR spectroscopy and MD simulation approach."; Oral presentation at Duquesne University Phi Lambda Upsilon Symposium, Pittsburgh, PA.
- Yenireddy, S.; **Makowski, J.*** (**Feb 2025**) "HIV-2 TAR: The Missing Puzzle Piece in the Search for a Cure to AIDS"; Oral presentation at Junior Science and Humanities Symposium Greater Washington, D.C. Regional Competition, Washington, DC.
- **Makowski, J.**; Kensinger, A.; Mihailescu, M.; Evanseck, J. (**Nov 2024**) "HIV-1 DIS atomistic transition pathway from kissing complex to extended duplex"; Oral presentation at ACS Central Regional Meeting 2024, Nucleic Acid Chemistry Section, Pittsburgh, PA.
- **Makowski, J.** (**July 2024**) "Effect of the Delta-associated G15U mutation in the s2m element of SARS-CoV-2 on its dimerization and host microRNA interactions."; Oral presentation at Duquesne University Phi Lambda Upsilon Symposium, Pittsburgh, PA.

- **Makowski, J.**; Kensinger, A.; Evanseck, J. (**March 2024**) "RNA-RNA complexation for HIV-1 antiviral intervention: Thermodynamic and kinetic parameters characterizing HIV-1 DIS homodimerization"; Oral presentation at Duquesne University Graduate Research Symposium, Pittsburgh, PA.

Posters

- Sims, S.; **Makowski, J.**; Roessler, A.; Evanseck, J. (**July 2025**) "Unraveling RNA Dimerization: Energetics of Hairpin to Kissing Complex Transition in E. coli DsrA-rpoS"; Poster presented at Duquesne University Undergraduate Research Symposium, Pittsburgh, PA.
- Soike, B.; Tasnim, S.; **Makowski, J.**; Evanseck, J. (**July 2025**) "Mg^{2+} Subtype-Specific Control of HIV-1 DIS Kissing Complex Dimerization: A Targeted Molecular Dynamics Study"; Poster presented at Duquesne University Undergraduate Research Symposium, Pittsburgh, PA.
- **Makowski, J.**; Matzel, T.; Kensinger, A.; Oxenfarth, A.; Wirtz Martin, M.; Evanseck, J.; Schwalbe, H. (**July 2025**) "Integrative Molecular Dynamics and NMR Reveal Conformational Ensembles of the SARS-CoV-2 Omicron s2m"; Poster presented at Duquesne University Phi Lambda Upsilon Graduate Chemistry Research Symposium.
- Soike, B.; **Makowski, J.**; Kensinger, A.; Evanseck, J. (**March 2025**) "Mg^{2+} Stabilization of HIV-1 DIS Kissing Complex: Implications of Ionic Atmosphere on Hydrogen Bonding and Structural Fluctuations"; Poster presented at the Duquesne University Undergraduate Research Symposium, Pittsburgh, PA.
- Rodo, E.; **Makowski, J.**; Evanseck, J. (**March 2025**) "Modeling Diastereoselectivity via Conformational Energy Landscapes of 5-Membered Ring Oxocarbenium Ions"; Poster presented at the ACS Spring National Meeting 2025, Organic Chemistry Division, San Diego, CA.
- Rodo, E.; **Makowski, J.**; Evanseck, J. (**March 2025**) "Modeling Diastereoselectivity via Conformational Energy Landscapes of 5-Membered Ring Oxocarbenium Ions"; Poster presented at the ACS Spring National Meeting 2025, Sci-Mix, San Diego, CA.
- **Makowski, J.**; Kensinger, A.; Wirtz, M.; Matzel, T.; Wacker, A.; Jonker, H.; Schwalbe, H.; Evanseck, J. (**Nov 2024**) "Labyrinthine dynamics of the apical nonaloop of SARS-CoV-2 Delta s2m by MD and NMR"; Poster presented at the ACS Central Regional Meeting 2024, Pittsburgh, PA.
- Rodo, E.; **Makowski, J.**; Evanseck, J. (**Nov 2024**) Oxocarbenium ion 5-membered ring conformational energies and geometries by DFT and MP2: Foundation for predicting acetal substitution diastereomeric ratios; Poster presented at the ACS Central Regional Meeting 2024, Pittsburgh, PA.
- Erben, T.; **Makowski, J.**; Kensinger, A.; Evanseck, J.; Seybert, D. (**Nov 2024**) ATP: An alternate role of an energy currency; Poster presented at the ACS Central Regional Meeting 2024, Pittsburgh, PA.
- White, C.; **Makowski, J.**; Roessler, A.; Evanseck, J. (**July 2024**) "Stereoelectronic effects of 3-methyl substitution on oxanorbornadiene retro Diels-Alder mechanophore activation"; Poster presented at Duquesne University Undergraduate Research Symposium, Pittsburgh, PA.
- Erben, T.; **Makowski, J.**; Kensinger, A.; Seybert, D.; Evanseck, J. (**July 2024**) "ATP: An Energy Currency or a Kinetic Regulation Mechanism"; Poster presented at Duquesne University Undergraduate Research Symposium, Pittsburgh, PA.
- **Makowski, J.**; Kensinger, A.; Evanseck, J. (**March 2024**) "RNA-RNA complexation for HIV-1 antiviral intervention: Thermodynamic and kinetic parameters characterizing HIV-1 DIS homodimerization"; Poster presented at Duquesne University Graduate Research Symposium, Pittsburgh, PA.
- Kensinger, A.; **Makowski, J.**; Evanseck, J. (**March 2024**) "3D Predictive Modeling and validation of RNA Kissing Complexes: Application to HIV-1 and Coronaviruses"; Poster presented at Duquesne University Graduate Research Symposium, Pittsburgh, PA.
- **Makowski, J.**; Kensinger, A.; Evanseck, J. (**June 2023**) "Transition pathway energetic barriers between stem-loop II motif secondary structures"; Poster presented at Duquesne University Phi Lambda Upsilon Graduate Chemistry Research Symposium.
- Kensinger, A.; **Makowski, J.**; Pellegrene, K.; Cunningham, C.; Frye, C.; Lackey, P.; Mihailescu, M.; Evanseck, J. (**March 2023**) "Structural and Dynamical Consequences of Individual G31U and U5C s2m Mutations Between SARS-CoV and SARS-CoV-2"; Poster presented at Duquesne University Graduate Research Symposium, Pittsburgh, PA.
- **Makowski, J.**; Evanseck, J. (**March 2023**) "RNA dynamics: conformations of SARS-CoV s2m distinguishableby topological data analysis"; Poster presented at Duquesne University Graduate Research Symposium, Pittsburgh, PA.

- **Makowski, J.**; Kensinger. A.; Pellegrene, K.; Cunningham, C.; Frye, C.; Lackey, P.; Mihailescu, M.; Evanseck, J. Delta variant versus ancestral SARS-CoV-2 s2m dynamics and relative entropy *Biophys J.* (**Feb 2023**); 122(3) 358a
- Dentley, K.; Tamez, A.; **Makowski, J**.; Evanseck, J.; Vernier, B. (**July 2022**) "Synergy and Binding Energy between Nectin-1 and HSV-2 Glycoprotein D"; Poster presented at Duquesne University Undergraduate Research Symposium, Pittsburgh, PA.
- **Makowski, J.**; Kensinger, A.; Pellegrene, K.; Frye, C.; Cunningham, C.; Lackey, P.; Mihailescu, M.; Evanseck, J. (**May 2022**) "Dynamical hierarchy of the s2m conserved element in SARS-CoV-, SARS-CoV-2, and Delta variant genomes"; Poster presented at Duquesne University Phi Lambda Upsilon Graduate Chemistry Research Symposium.
- Kensinger, A.; **Makowski, J.**; Pellegrene, K.; Cunningham, C.; Frye, C.; Lackey, P.; Mihailescu, M.; Evanseck, J. (**May 2022**) "Molecular Dynamics Simulations Consistent with NMR on the Secondary and Tertiary Structure Differences in SARS-CoV and SARS-CoV-2 s2m Conserved Elements"; Poster presented at Duquesne University Phi Lambda Upsilon Graduate Chemistry Research Symposium.
- Cunningham, C.; Frye, C.; Imperatore, J.; Pellegene, K.; Kensinger, A.; **Makowski, J.**; Shine, M.; Lackey, P.; Evanseck, J.; Mihailescu, M. (**May 2022**) "Characterization of the Conserved SARS-CoV-2 s2m Secondary Structure"; Poster presented at Duquesne University Phi Lambda Upsilon Graduate Chemistry Research Symposium.
- **Makowski, J.**; Kensinger, A.; Pellegrene, K.; Cunningham, C.; Frye, C.; Shine, M.; Bojanac, I.; Lackey, P.; Mihailescu, M.; Evanseck, J. Stem-loop II motif (s2m) structural and dynamical differences between SARS-CoV-2 and B.1.617.2 (Delta) variant *Biophys J.* (**Feb 2022**);121(3) 207a-207a.
- Kensinger, A.; Pellegrene, K.; **Makowski, J.**; Cunningham, C.; Frye, C.; Mihailescu, M.; Evanseck, J. Structural and dynamical impact of the two-nucleotide difference in sequence between SARS-CoV and SARS-CoV-2 s2m using molecular dynamics *Biophys J.* (**Feb 2022**);121(3) 207a-207a.
- Frye, C.; Cunningham, C.; Pellegrene, K.; Kensinger, A.; **Makowski, J.**; Evanseck, J.; Mihailescu, M. Viral-host RNA-RNA interactions in SARS-CoV-2: study of miR-760-3p interactions with the genome 3'-untranslated region *Biophys J.* (**Feb 2022**);121(3) 207a-207a.
- Cunningham, C.; Frye, C.; Imperatore, J.; Pellegrene, K.; Kensinger, A.; **Makowski, J.**; Shine, M.; Lackey, P.; Evanseck, J.; Mihailescu, M. Characterization of the s2m G15U mutation associated with the SARS-CoV-2 delta variant *Biophys J.* (**Feb 2022**);121(3) 207a-207a.
- **Makowski, J.**; Rodo, E.; Woerpel, K.; Evanseck, J. (**July 2020**) "Distinguishing Between Steric and Electrostatic Effects on Stereochemistry of Nucleophilic Addition to Five- and Six-Membered Oxocarbenium Ions"; Poster presented at Duquesne University Undergraduate Research Symposium, online.
- Rodo, E.; Castele, E.; **Makowski, J.**; Evanseck, J. (**July 2020**) "CCSD(T) and DFT torsional energy scan comparisons on 3-aryl substituted oxocarbenium ions"; Poster presented at Duquesne University Undergraduate Research Symposium, online.
- **Makowski, J.**; Rodo, E.; Woerpel, K.; Evanseck, J. (**July 2020**) "Two Transition Structure Noncovalent Interactions Account for Stereochemistry of Nucleophilic Addition to Five- and Six-Membered Oxocarbenium Ions"; Poster presented at URAN|UM (University of Michigan), online.
- Rodo, E.; Castele, E.; **Makowski, J.**; Evanseck, J. (**July 2020**) "DFT Compared to the 'Gold Standard' for Nucleophilic Addition in Carbohydrates"; Poster presented at URAN|UM (University of Michigan), online.
- **Makowski, J.**; Evanseck, J. (**Nov. 2019**) "Effects of Solvation on Formyl Hydrogen Bond Formation"; Poster presented at Gamma Sigma Epsilon Biennial National Convention, Davidson, NC.
- **Makowski, J.**; Evanseck, J. (**July 2019**) "Effects of Solvation on Formyl Hydrogen Bond Formation"; Poster presented at Duquesne University Undergraduate Research Symposium, Pittsburgh, PA.
- **Makowski, J.**; Brothers, S. (**April 2019**) "Efficacy of 'Green' Reducing Agents in the Synthesis of Silver Nanoparticles"; Poster presented at Bethany College Symposium of Scholarship, Bethany, WV.