HOW TO WRITE AN ABSTRACT

Twitter: @URSymposium
Facebook: Undergraduate Research Symposium

UNDERGRADUATE RESEARCH SYMPOSIUM

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UR SYMPOSIUM

Who: Open to all undergraduates who are involved in research (on-campus or off-campus).

Why: To our knowledge, there is currently no forum on campus open for undergraduate researchers of all disciplines to present their work except for the UROP symposium, which is limited to UROP students (freshmen and some sophomores).

What: An opportunity for undergraduate researchers to...

- Showcase their work to peers and faculty members through poster presentations
- Win travel awards that support costs associated with attending research conferences.

When: Friday, April 5th, 2019.

Where: Chemistry Building Atrium on Central Campus.

BACKGROUND: WHY ABSTRACTS?

“That is, while even the most skillful writing cannot turn bad science into good science, clear and compelling writing makes good science more impactful, and thus more valuable.”

TYPES OF ABSTRACTS

UR SYMPOSIUM

DESCRIPTIVE

a) Background, minimal results

*INFORMATIVE

a) Includes all relevant information in the paper: intro, importance, brief results, conclusion.

STRUCTURED - paragraph per section of information

NON-STRUCTURED - no specific format to information flow

***SEMI-STRUCTURED** - sentence per section (1 paragraph)

WORD CHOICE:

Concise

Easy to understand: use common words over the complicated ones.

Few abbreviations

Watch tense

Use precise language

ELEMENTS TO INCLUDE

1. **Motivation/problem statement**: Why is your research/argument important? What practical, scientific, theoretical or artistic gap is your project filling?

2. **Methods/procedure/approach**: What did you actually do to get your results? (e.g. analyzed 3 novels, completed a series of 5 oil paintings, interviewed 17 students)

3. **Results/findings/product:** As a result of completing the above procedure, what did you learn/invent/create?

4. **Conclusion/implications:** What are the larger implications of your findings, especially for the problem/gap identified previously? Why is this research valuable?

?? TO ASK BEFORE WRITING

1. What is the topic/area that your research is in?
    a. BACKGROUND
2. What question are you answering? What problem are you addressing?
    a. RESEARCH QUESTION
3. How are you conducting your research?
    a. METHODS
4. What have you found? Or hope to find?
    a. RESULTS
5. What does that mean (bigger picture/contextually?)
    a. CONCLUSION/IMPACT

Take a second and sketch out a draft abstract

PRACTICE ABSTRACT ANALYSIS

Does the Abstract contain the necessary elements?

a. BACKGROUND
b. RESEARCH QUESTION
c. METHODS
d. RESULTS
e. CONCLUSION/IMPACT

BACKGROUND, RESEARCH QUESTION, METHODS, RESULTS, CONCLUSION/IMPACT

Computational Catalysis: Creating a User-Friendly Tool for Research and Education

Catalysis is used in a significant portion of production processes in the industrialized world, including most processing of chemicals and fuels. This makes maximizing the efficiency of catalysts a high priority. However, the immense number of candidates for new catalysts precludes the possibility of testing all of them by experiments. Density functional theory (DFT) has been widely and successfully used to calculate material properties relevant to catalysis and to screen promising candidates for experimental testing, but there currently exists no publicly- available, user-friendly tool for performing these DFT calculations. This work details the development of such a tool for nanoHUB.org using Quantum Espresso and the Atomic Simulation Environment Python library. Testing was performed for a variety of preloaded structures and surfaces to determine the optimal input values for achieving accurate results in minimal time. The tool's capabilities were evaluated by benchmarking its results against those of previous computational work. The close agreement of these results indicates the readiness of the tool for use in research, and the user interface will enable its use in education to teach students about catalysis and to inspire the next generation of researchers in the field.

BACKGROUND, RESEARCH QUESTION, METHODS, RESULTS, CONCLUSION/IMPACT

Thermodynamic models to aid the experimental design of multivalent systems: Polymer brushes and nanoparticles

Recently, there has been an upsurge in developing pharmaceutical agents with high specificity through multivalent interactions, with nanoparticles being one of the most prominent applications. Multivalent interactions, which involve two different biological entities binding through multiple ligands and receptors, are often seen in nature when a tight bond cannot be achieved with weak univalent protein-ligand interactions. As the ligand binds to the protein receptor, the subsequent intramolecular interactions are much more favorable due to the proximity effect; as such, the overall strength of the multiple affinities increases. However, a nanoparticle can be designed many ways, and as such, a model of the different variations is important in determining which one better suits the criteria. Herein, we explore the binding states of Janus particles—where the different ligands are distributed in patches, and of randomly distributed homogenous particles. We have a designed a MATLAB program that is able to determine the percentage of bound species with adaptable parameters, such as ligand density, length, percentage, and nanoparticle design. Additionally, it is able to determine the distribution of the bound states.

BACKGROUND, RESEARCH QUESTION, METHODS, RESULTS, CONCLUSION/IMPACT

Temporal changes in Pseudomonas aeruginosa flagellar control during early biofilm formation

Biofilms, or aggregate bacterial communities that associate with an interface, exist in nearly every ecological niche and are phenotypically distinct from free-living, planktonic bacteria. The control of cellular motility is key in the bacterial transition from a planktonic lifestyle into the sessile lifestyle necessitated by biofilm formation. While the key regulators of motility during biofilm formation have been identified, little is known about the temporal progression of this process. Recent work in the Wong Lab has demonstrated opportunistic pathogen Pseudomonas aeruginosa exhibits a multigenerational “memory” of the surface mediated by second messengers such as cAMP. These data suggest that in early stages of biofilm formation, functional pili are required to maintain a specific subpopulation of bacteria at the surface. Cells without functional pili are deficient at maintaining this population, and thus exhibit delayed biofilm formation.

BACKGROUND, RESEARCH QUESTION, METHODS, RESULTS, CONCLUSION/IMPACT

Electrocatalytic Bis(bipyridine)ruthenium Hydroxylation of Tertiary and Benzylic C–H Bonds

This published method requires a stoichiometric amount of periodic acid to generate and turnover the active catalyst species. Efforts toward the development of an electrocatalytic method for generating the active catalyst in solution are disclosed. Performing the reaction electrocatalytically eliminates the need for periodic acid. Furthermore, the absence of periodic acid opens the possibility for broadening the functional group tolerance as well as reducing the amount of waste generated.

UR APPLICATION

SUBMISSION PROMPT:

Please copy and paste your research abstract in the text box below. Abstracts are due March 1, 2019. (250 word limit) *

What are we looking for?

- **Between 150-250 words**
- **Describes your research project concisely and accurately**
- **An indication of how far along you intend to be by the symposium (note that projects at all stages can be presented on)**

Importance of scientific communication:

https://www.youtube.com/watch?v=JKog0lk3DXo

THANK YOU!

QUESTIONS??