**Undergraduate Research Project**

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| **Project Name:** | Exceptional affine standard Lyndon words through coding | **Number of Positions:** | 1-2 |
| **Supervisor:** | Oleksandr (Sasha) Tsymbaliuk  |
| **Supervisor e-mail:** | otsymbal@purdue.edu |
| **Project Description:** | This project is devoted to the study of affine standard Lyndon words, which provide a combinatorial approach to affine Lie algebras. The essential component of the project is to produce the efficient computer code that computes these combinatorial words for any affine Lie algebra and any order of simple roots. The important application will be to derive the explicit formulas for exceptional types (G\_2, F\_4, E\_6, E\_7, E\_8). If time permits, study the relation of these words to Green/Rosso q-shuffle algebra.  |
| **Final Deliverables:** | Final Report. Published article is possible if significant results are obtained.  |
| **Weekly Working Hours** | * Minimum of 10h per week during the semester
* Full time during the summer
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| **For Credits/Voluntary**  | Voluntary (1 credit course is possible, if arranged and approved in advance) Funding is poss ible (but needs to be applied for) |
| **Desired Qualifications**  | Required: Linear Algebra, Coding experience (e.g. in Mathematica) Preferred: Lie algebras  |

**If you are interested in participating in this research project, please send an e-mail to the supervisor e-mail listed above together with a resume, a list of what courses you’ve taken or a copy of your transcript, and a personal statement explaining why you are interested in this project.**