COLLABORATIVE RESEARCH PROJECT (CRP)

The inaugural **Collaborative Research Project (CRP)** in mathematics will be held in March 2015. The event features teams of up to 4 undergraduates at a handful of colleges and universities in the United States; unlike some competitions, all teams will be collaborating with each other on a mathematics research problem.

Name Change

Some of you have already noticed our name change, from CURE to CRP. We learned that the name CURE (Collaborative Undergrad Research Experience) is already in use, by a collaborative REU at UC San Diego. While we like our new name, we also welcome suggestions for what to call this endeavor in future years.

Overall Goals

The primary goal of CRP is to offer undergraduates a collaborative research experience, in which they collaborate both within and outside their institution. The research topic is chosen to be both approachable by undergraduates and of wide interest to the mathematical community. Students will be exposed to different types of social tools for collaboration and will hopefully gain valuable experience on how mathematical research builds upon the results of others.

The results of the CRP collaboration will be submitted for publication.

2015 Research Topic

The 2015 CRP research topic will be released on the CRP website on March 1st. This year's question was first posed by a pair of preeminent mathematicians whose work is well-known in both pure and applied mathematics circles. The CRP Problem Team has worked to develop a large-scale undergraduate research topic from this problem.

Team Composition & Faculty Advisor

CRP teams are comprised of up to 4 students, together with a faculty advisor. Unlike some competitions, the faculty advisor may assist the team as a 'resource' person, e.g., helping students get access to computers, space on campus, software, etc.; providing encouragement. Mentors should not be active participants in the research project itself.

For this year's topic, there are no undergraduate prerequisites! *Undergraduate students of all levels* are welcome to participate. As with any mathematics research endeavor, familiarity with proof techniques is certainly valuable.

Registration

By February 15th, a Team Registration form will be available from the CRP website; we only require basic contact details for each team member and the faculty advisor. There is

no cost to register a team. Institutions wishing to sponsor multiple teams should contact the CRP organizers.

Technical Requirements & Collaborative Platform

All CRP materials will be accessible via the CRP website. This year, CRP will be using a main collaborative platform (likely either a Wiki or Stack Exchange) and a Twitter feed. The organizers are encouraging teams to develop other useful methods of sharing.

The only technical requirements are (1) a reasonable internet connection and (2) the ability to submit solutions in LaTex (teams may learn LaTex as they go).

Timeline

- *February 15th* – Registration form available
- *February 25th* – Registration deadline **
- *March 1st* – CRP begins. Problem description emailed to participants and faculty advisors and released on CRP website. CRP collaborative platform goes live.
- *March 31st* – CRP ends. All submissions must reach the CRP Problem Team by 11:59pm EDT. While the CRP collaborative platform will remain live, any contributions received after this deadline will not be eligible for recognition.
- *April 30th* – CRP initial recognitions released

** - since this is the inaugural competition, this deadline may be waived by the organizers

Submission Format

Each team will submit, using the provided LaTex template,

- 1-page summary
- a full description of your team's results, including all necessary definitions and proofs.

Each individual will submit via a web-based form

- a summary of their contributions and collaborations (used in determining recognition levels) – the *Individual Collaboration Form*
- a feedback form, for evaluating and improving CRP.

Recognition Levels & Publication

The CRP Problem Team will read all summary sheets and review each team's submission. The Problem Team will then draft one (or possibly more) research article(s) to be submitted for publication describing the main results of the CRP experience.

Based upon the teams' submissions and each individual's contribution, the CRP Problem Team will award the following distinctions:

(1) *Primary Author* – Those individuals making primary contributions to the research article will be designated as *Primary Authors*. They will be listed as authors on the submitted article and will be asked to review a draft of the article before it is submitted. "CRP Problem Group" will also be listed an author, to recognize everyone's contributions.

(2) *Acknowledged Contributor* – Those individuals making a significant contribution to the advancement of the CRP project, but who did not make a direct, primary contribution to what is to be published, will be listed by name in the Acknowledgements section of the research article.

(3) *Participant* – All CRP participants who submit the Individual Collaboration Form will be listed on the CRP website as *Participants*.

Both *Primary Authors* and *Acknowledged Contributors* will be featured on the CRP website with a photo [optional] and will be asked to write a paragraph summarizing their contributions. (Paragraphs may be edited by the CRP Problem Team.)

Future of CRP

The organizers plan for CRP to become an annual event. In subsequent years, we intend to have 2 separate research projects. One project will be aimed at students in the calculus sequence, and the other will be aimed at advanced students. In 2016, this refined version of CRP will be tested on a larger sample of schools, with assessment data collected using an instrument similar to that used to study REU programs. We are seeking faculty members to serve on the CRP Problem Teams. The feedback provided in 2015 from both participants and faculty advisors will be used to help structure future contests – please let us know what works well and what could improve!

CRP Organizers

- Frank Moore (Wake Forest)
- Mike Orrison (Harvey-Mudd)
- Jason Parsley (Wake Forest)
- Joseph Rusinko (Winthrop)

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`http://college.wfu.edu/crp`