CCI – 2018

Mike Stegman

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Required DOE deliverables

1) Poster Presentation:

All participants are required to deliver a poster presentation before an appropriate peer group. The subject matter for the presentation is to be based upon the participant's internship project activities. Prior to the poster presentation, submission of a short (150 word) abstract summarizing the presentation content, as well as all final content used in the presentation, is required.

2) Project Report Paper:

All CCI participants are required to submit a project report for their internship activities. This report should be a summary of the project's technical goals; progress made to achieve these goals, and specific accomplishments made by the intern including their impact. The report should include any project relevant technical writing, drawings, schematics, designs, or diagrams, contributed to by the intern. Submission must be made prior to the end of your appointment and as directed by your host laboratory.

3) DOE Surveys:

Pre-survey and Post-survey at WDTS site.

Required “deliverables”

1. **DOE Pre-Survey**
2. **Poster, including an abstract – 150 word limit for abstract**
3. **Project Report Paper – No more than 6 pages, excluding this report’s abstract, footnotes, appendices (< 3 pages), references, bibliography, or other similar items.**
4. **Peer Review of Presentations**
5. **Abstract for a General Audience – 300 word limit**
6. **BNL Exit survey**
7. **DOE Post-Survey – due during the final before departure from BNL**

NOTE: With the exception of the two DOE surveys, ALL DOE materials MUST be uploaded via WDTS site as PDF files ONLY, no exceptions. **OEP materials** should be submitted through scienceinterns.com email addresses.

Deadlines

All FRIDAYS	Weekly Report (except 8/10)
6/8	DOE Pre-survey
6/8	New Appointment Checklist
6/29	Abstract for a General Audience (Draft 1)
7/5 – 7/13	Writing Conferences
7/19	Abstract for a General Audience (Departmental Draft)
7/23 – 7/27	Writing Conferences
TBD	Report title submitted
7/31	Poster printing deadline
7/31	Abstract for a General Audience (Draft 3)
8/7 noon	Symposium PowerPoint Presentations submitted
8/8	All Deliverables, including BNL Exit Survey
8/8	DOE Post-survey

Document Naming Convention

- **All document names must begin using the following template:**
  - **ALL CAPS, no space (use underscore)**
  - **LASTNAME_FIRSTINITIAL_deliverabletype**
    - **STEGMAN_M_abstract**

General types: Abstract for a general Audience, Research Report, Poster

- I – M – R – A – D

  Introduction, Methods, Results, And Discussion

- Narrative, Process, et al.

Poster plus abstract

- See http://www.bnl.gov/education/info.asp for more information and details on dimensions, etc.
- Each poster must include an abstract of no more than 150 words

Poster Ideas

- Use PowerPoint
- ONE page
- Dimensions: Custom, 30w X 40h
- White background ONLY
- Include LOGOS: DOE, BNL, your school, and funding (if other than DOE)
  - http://www.bnl.gov/education/StudentInfo/logos.html
- Limit font choices
- Include: Abstract plus the conventional divisions:
  - Introduction, Methods, Results, Discussion, Conclusions, Acknowledgements
  - Introduction, Resources, Outcomes, Discussion, Acknowledgements
- Consider: OBJECTIVES as a bulleted list
- Use layout grid for organization
- Include graphs, charts, photos, etc.

See http://www.bnl.gov/education/info.asp OR the scienceinterns.com FAQ page for more information.

Peer Review of Presentations

- Poster Sessions: Wednesday/Thursday, August 8 and 9
- Peer Review Due: Before you leave BNL
- **See Cindi at poster check-in OR download form from scienceinterns.com**
- When preparing the one-page written peer review of the presentation, please include an assessment of the following:
  - **Content**. Was the presentation informative? Did it have a clear focus? Was it well researched?
  - **Organization/Clarity**. Was it easy to follow? Was there a clear introduction and conclusion?
  - **Visual aids**. Did the presenter make effective use of visual resources, image design, layout, etc.? Was the text large enough to be easily seen?
- Submit to DOE as a PDF
- Submit to OEP as a pic or PDF attachment to

  reviews@scienceinterns.com (tentative address)

Abstract for General Audience

- Length: <300 words
- This summary should highlight research accomplishment(s), be written at a level approachable by a broad and largely non-subject matter expert audience (*Scientific American* level of sophistication). Finally, describe Department of Energy programmatic or mission relevance of your activities, define the institutional setting, and generally discuss how your appointment 's activities, outcomes, impacts, or lessons learned contributed to your professional growth.

Abstract for General Audience

- Length: <300 words
- This summary should highlight research accomplishment(s), be written at a level approachable by a broad and largely non-subject matter expert audience (*Scientific American* level of sophistication). Finally, describe Department of Energy programmatic or mission relevance of your activities, define the institutional setting, and generally discuss how your appointment 's activities, outcomes, impacts, or lessons learned contributed to your professional growth.

Possible outline for abstract

- IMRD
  - Introduction (Area of interest, purpose or rationale)
  - Methods (how you did it)
  - Results (what you found)
  - Discussion (what it means / what is next)
- Narrative
  - Introduction
  - Approach to project
  - Accomplishments / Outcomes
  - Significance / Future

Abstract for a General Audience, Sample

The Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory requires a highly polarized proton beam for spin-polarization studies. During each experimental run, 250 GeV protons are elastically scattered from a carbon micro-ribbon target 10 μm wide and 50 nm thick to monitor the degree of proton beam polarization. Experiments have shown that the amorphous carbon targets have poor electrical conductivity, limiting their lifetime. Since RHIC operates continuously for several months at a time under ultra-high vacuum, it is costly and inefficient to use carbon targets with short lifetimes. Our study has examined the few micro-ribbons that serendipitously survived a recent RHIC experimental run. Transmission electron microscopy diffraction pattern analysis of the micro-ribbons shows that heating from the RHIC beam has crystallized the amorphous carbon into graphite. In addition to examining micro-ribbons fabricated by Collider-Accelerator Department staff, we are exploring new methods of micro-ribbon fabrication that will have superior material properties. One possible approach consists of depositing thin films of nickel and carbon on a silicon wafer through an anisotropically-etched silicon wafer mask. By annealing amorphous carbon micro-ribbons, we consistently achieve conductivity and crystallinity results similar to those found in the surviving RHIC micro-ribbons. When annealed at 700 °C, a 10 nm thick amorphous carbon layer forms a solid solution within the 50 nm thick nickel layer before recrystallizing as graphene on the surface of the nickel. Graphene is well known to have superior electrical conductivity and tensile strength, and may well prove to be an ideal material for the next generation of micro-ribbon targets for RHIC during its next proton polarimetry experiments in 2015. As a result of this summer, I have added electron microscopy to my repertoire of materials characterization techniques. Additionally, I am now familiar with microfabrication processes and several software programs including DesignCAD, NPGS, MathCAD, and Scandium.

Activities (inc. institutional setting)

The Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory requires a highly polarized proton beam for spin-polarization studies. During each experimental run, 250 GeV protons are elastically scattered from a carbon micro-ribbon target 10 μm wide and 50 nm thick to monitor the degree of proton beam polarization. Experiments have shown that the amorphous carbon targets have poor electrical conductivity, limiting their lifetime. Since RHIC operates continuously for several months at a time under ultra-high vacuum, it is costly and inefficient to use carbon targets with short lifetimes. Our study has examined the few micro-ribbons that serendipitously survived a recent RHIC experimental run. Transmission electron microscopy diffraction pattern analysis of the micro-ribbons shows that heating from the RHIC beam has crystallized the amorphous carbon into graphite. In addition to examining micro-ribbowe are exploring new methods of micro-ribbon fabrication that will have superior material properties. One ns fabricated by Collider-Accelerator Department staff, possible approach consists of depositing thin films of nickel and carbon on a silicon wafer through an anisotropically-etched silicon wafer mask. By annealing amorphous carbon micro-ribbons, we consistently achieve conductivity and crystallinity results similar to those found in the surviving RHIC micro-ribbons. When annealed at 700 °C, a 10 nm thick amorphous carbon layer forms a solid solution within the 50 nm thick nickel layer before recrystallizing as graphene on the surface of the nickel. Graphene is well known to have superior electrical conductivity and tensile strength, and may well prove to be an ideal material for the next generation of micro-ribbon targets for RHIC during its next proton polarimetry experiments in 2015. As a result of this summer, I have added electron microscopy to my repertoire of materials characterization techniques. Additionally, I am now familiar with microfabrication processes and several software programs including DesignCAD, NPGS, MathCAD, and Scandium.

Accomplishments

The Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory requires a highly polarized proton beam for spin-polarization studies. During each experimental run, 250 GeV protons are elastically scattered from a carbon micro-ribbon target 10 μm wide and 50 nm thick to monitor the degree of proton beam polarization. Experiments have shown that the amorphous carbon targets have poor electrical conductivity, limiting their lifetime. Since RHIC operates continuously for several months at a time under ultra-high vacuum, it is costly and inefficient to use carbon targets with short lifetimes. Our study has examined the few micro-ribbons that serendipitously survived a recent RHIC experimental run. Transmission electron microscopy diffraction pattern analysis of the micro-ribbons shows that heating from the RHIC beam has crystallized the amorphous carbon into graphite. In addition to examining micro-ribbons fabricated by Collider-Accelerator Department staff, we are exploring new methods of micro-ribbon fabrication that will have superior material properties. One possible approach consists of depositing thin films of nickel and carbon on a silicon wafer through an anisotropically-etched silicon wafer mask. By annealing amorphous carbon micro-ribbons, we consistently achieved conductivity and crystallinity results similar to those found in the surviving RHIC micro-ribbons. When annealed at 700 °C, a 10 nm thick amorphous carbon layer forms a solid solution within the 50 nm thick nickel layer before recrystallizing as graphene on the surface of the nickel. Graphene is well known to have superior electrical conductivity and tensile strength, and may well prove to be an ideal material for the next generation of micro-ribbon targets for RHIC during its next proton polarimetry experiments in 2015. As a result of this summer, I have added electron microscopy to my repertoire of materials characterization techniques. Additionally, I am now familiar with microfabrication processes and several software programs including DesignCAD, NPGS, MathCAD, and Scandium.

Impact on BNL research

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Relevance (e. g., emerging technologies)

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Lessons learned

The Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory requires a highly polarized proton beam for spin-polarization studies. During each experimental run, 250 GeV protons are elastically scattered from a carbon micro-ribbon target 10 µm wide and 50 nm thick to monitor the degree of proton beam polarization. Experiments have shown that the amorphous carbon targets have poor electrical conductivity, limiting their lifetime. Since RHIC operates continuously for several months at a time under ultra-high vacuum, it is costly and inefficient to use carbon targets with short lifetimes. Our study has examined the few micro-ribbons that serendipitously survived a recent RHIC experimental run. Transmission electron microscopy diffraction pattern analysis of the micro-ribbons shows that heating from the RHIC beam has crystallized the amorphous carbon into graphite. In addition to examining micro-ribbons fabricated by Collider-Accelerator Department staff, we are exploring new methods of micro-ribbon fabrication that will have superior material properties. One possible approach consists of depositing thin films of nickel and carbon on a silicon wafer through an anisotropically-etched silicon wafer mask. By annealing amorphous carbon micro-ribbons, we consistently achieve conductivity and crystallinity results similar to those found in the surviving RHIC micro-ribbons. When annealed at 700 °C, a 10 nm thick amorphous carbon layer forms a solid solution within the 50 nm thick nickel layer before recrystallizing as graphene on the surface of the nickel. **Graphene is well known to have superior electrical conductivity and tensile strength, and may well prove to be an ideal material for the next generation of micro-ribbon targets** for RHIC during its next proton polarimetry experiments in 2015. As a result of this summer, I have added electron microscopy to my repertoire of materials characterization techniques. Additionally, I am now familiar with microfabrication processes and several software programs including DesignCAD, NPGS, MathCAD, and Scandium.

Professional development

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Abstract for a General Audience

A summary of your BNL experience OR a research paper abstract

- **Alternate format for Abstract for a General Audience using a scientific research paper outline**
  - An **introduction** that succinctly describes and appropriately connects the subject and context/ background to the purpose of the investigation;
  - A **methods** section that succinctly identifies the methods used to study the subject of the investigation;
  - A **results** section that provides a succinct and specific explanation of what was discovered, accomplished, collected or produced;
  - A **discussion** that provides a succinct interpretation of the results and evaluates what the results mean to the investigation, or when results were not obtained evaluates what the completion of the investigation could mean within a larger field.

Abstract for a General Audience, Sample

The Relativistic Heavy Ion Collider (RHIC) at Brookhaven National Laboratory requires a highly polarized proton beam for spin-polarization studies. During each experimental run, 250 GeV protons are elastically scattered from a carbon micro-ribbon target 10 μm wide and 50 nm thick to monitor the degree of proton beam polarization. Experiments have shown that the amorphous carbon targets have poor electrical conductivity, limiting their lifetime. Since RHIC operates continuously for several months at a time under ultra-high vacuum, it is costly and inefficient to use carbon targets with short lifetimes. Our study has examined the few micro-ribbons that serendipitously survived a recent RHIC experimental run. Transmission electron microscopy diffraction pattern analysis of the micro-ribbons shows that heating from the RHIC beam has crystallized the amorphous carbon into graphite. In addition to examining micro-ribbons fabricated by Collider-Accelerator Department staff, we are exploring new methods of micro-ribbon fabrication that will have superior material properties. One possible approach consists of depositing thin films of nickel and carbon on a silicon wafer through an anisotropically-etched silicon wafer mask. By annealing amorphous carbon micro-ribbons, we consistently achieve conductivity and crystallinity results similar to those found in the surviving RHIC micro-ribbons. When annealed at 700 °C, a 10 nm thick amorphous carbon layer forms a solid solution within the 50 nm thick nickel layer before recrystallizing as graphene on the surface of the nickel. Graphene is well known to have superior electrical conductivity and tensile strength, and may well prove to be an ideal material for the next generation of micro-ribbon targets for RHIC during its next proton polarimetry experiments in 2015. As a result of this summer, I have added electron microscopy to my repertoire of materials characterization techniques. Additionally, I am now familiar with microfabrication processes and several software programs including DesignCAD, NPGS, MathCAD, and Scandium.

Format for the Abstract for a General Audience

- **DEPARTMENT GROUP**
  - Top left, first line: List one of these four general departmental groupings: Chemistry, Physics, Life Sciences, or Engineering, et al.
  - **NOTE**: Life Sciences includes Biology and Environmental.
- **TITLE**
  - Skip a line and then include your title here, even if it is not the final version. Be sure to capitalize **ONLY** the first word; no acronyms.
- **AUTHORS**
  - Skip a line and then begin with yourself are the first author; include your school information. You mentor is the last author; include his/her BNL information. See program deliverables or writing workshop PDF for more information on author format.
- **TEXT**
  - Skip a line. Indent paragraph, double-space, 12 point Times Roman, flush left. Define all acronyms used more than once in this abstract. ONE paragraph only. 300 word limit, excluding title and authors.

Format for the Abstract for a General Audience

One, double-spaced paragraph (< 300 words), indent first line, no justification.

The title of your report; not a label

Your author information

Your mentor's information

PHYSICS

Your title goes here with only the first word capitalized
Your Name, Your Department, Your School, City, State ZIP
Your Mentor, Department, Brookhaven National Laboratory, Upton, NY 11973

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean facilisis luctus erat sed blandit. Nullam varius elit a mi vestibulum, quis scelerisque dui hendrerit. Nullam convallis augue id ullamcorper semper. Phasellus sed lacus pulvinar, placerat magna vehicula, scelerisque velit. Quisque magna mi, suscipit non velit a, viverra condimentum dolor. Duis tempus convallis gravida. Phasellus pharetra sit amet neque eget pretium. Cras consectetur tortor at ligula vulputate, sed malesuada elit volutpat. Fusce scelerisque, est non ornare fermentum, quam nisi imperdiet mauris, at tristique purus dolor in lorem. Fusce scelerisque odio vitae lorem iaculis rhoncus. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Etiam cursus tempor condimentum. Integer tempus adipiscing viverra. Aliquam erat volutpat. Suspendisse potenti. Maecenas mollis suscipit nisl, vel egestas nisi tincidunt non. Proin lobortis nisl vitae fringilla convallis. Morbi varius laoreet risus, eu tincidunt leo iaculis aliquet. Aliquam et orci metus. Nulla posuere, quam sit amet porta iaculis, turpis justo dignissim arcu, vel adipiscing arcu nunc at sapien. In vitae libero in eros accumsan scelerisque. Curabitur congue commodo dui a consectetur. Nam luctus dolor non est posuere vulputate. Nullam ipsum ipsum, elementum a tristique vel, congue eget est. Aliquam non sem eros. Nullam urna neque, hendrerit vel sem vestibulum, faucibus vehicula libero. Maecenas eleifend mauris purus, eget aliquet nunc dapibus in. Vivamus non nibh nisl. Cras condimentum gravida dui, a imperdiet nibh consequat eget.

PROJECT REPORT, CCI format

- This required report should communicate the outcomes and success of your project activities to the Office of Workforce Development for Teachers and Scientists (WDTS). It is not intended to be a scientific publication, and should be a **narrative** on meaningful outcomes and accomplishments made during your internship. The content of your report should be written at a level for readers who are not necessarily subject matter experts, but do have general scientific or technical knowledge and research experience.

Project Report Paper

- **I. General instructions**
  - Submit manuscripts in English only (American spelling).
  - Indent paragraphs, so that the start of a new paragraph is clearly distinguished from the continuation of an existing one after a displayed equation.
  - Number all pages in sequence, beginning with the title and abstract page.
  - Single space the report.
  - Use a minimum 12 point font.

Project Report Paper

- **II. Title**
  - Place the title about a third of the way down from the top of the first page.
  - Begin the first word with a capital letter; thereafter capitalize only proper names and acronyms.
  - Author(s): You as the first author, your mentor as concluding author. Identify affiliated institutions.

Project Report Paper

- Authors’ names and affiliations
  - Type the authors’ names above their affiliations
  - Omit titles such as Professor, Doctor, etc.
  - In the affiliation, use no abbreviations except DC (for District of Columbia). Give an adequate postal address including the ZIP
  - See page 6 and 7 of AIP Style Manual for examples of how to format authors’ names.

Title/Author

Drag on an axially symmetric body in the Stokes flow of micropolar fluids

John J. Doe and James G. Smith

Department of Physics, Massachusetts Institute of Technology, Cambridge, Masssachusetts 02139

Your name

Your Department, Your College, City, State ZIP

Your mentor

Mentor's Department, Brookhaven National Laboratory, Upton, NY 11973

Title/Author

pp interactions at 300 GeV/*c*: Measurement of the charged-particle multiplicity and the total and elastic cross sections

J. I. Herman

Department of Physics and Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720, and Blackett Laboratory of Physics, Imperial College, London SW7 2BZ, England

Alfred E. Schmidt and Kurt Schwarz

Fakultät für Physik, Universität Bielefeld, 48 Bielefeld, Federal Republic of Germany

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Your name

Your Department, Your College, City, State ZIP

Other BNL collaborators and Your mentor

Mentor’s Department, Brookhaven National Laboratory, Upton, NY 11973

Required Elements, CCI format
Abstract: objective(s), activities, accomplishments

Abstract Content

- State the subject of the paper immediately, indicating the **scope and objectives of your project**. Do this in terms understandable to a non-specialist. Describe the treatment given the subject by one or more such terms such as "brief," "comprehensive," "preliminary," "experimental," or "theoretical."
- Summarize your **activities** throughout the course of the summer--e. g., what you did and how it related to your project's objectives—especially your project's **progress** toward its objective.
- Summarize the **accomplishments** of your project and include the **future work** that may be accomplished after your internship ends and its **impact** on the mission of the laboratory or the DOE. Do not hesitate to give numerical results or state your conclusions in the abstract.

Abstract Format

- Do not cite the literature references by the numbers in the list at the end of the paper, and do not refer by number to a selection, equation, table, or figure within the paper. Nonstandard symbols and abbreviations used in the abstract must be defined there as well as in the main text.
- Use running text only. Never use displayed mathematical expressions or numbered equations. Omit tables, figures, and footnotes.
- Keep the length of the abstract to a small percentage of that of the paper. Write concise, straightforward English; make every word count. Try to substitute words for phrases and phrases for clauses. Be terse, but not telegraphic; do not omit a's, an's, or the's. Regardless of the length of the final draft of your abstract, study it again with a view to shortening it further to a minimum length.
- The abstract does not count toward the six page limit of your report's body.

Required Elements, CCI format

Body: introduction, progress, future work, impact, conclusion, references

- **Introduction** Provide the context of past and competing technical work that motivated the project; how the present activity goes beyond that work; the proposed technical objectives of this work, and how well they were met, including any additional objectives that developed in the course of your activity.
- **Progress** - Technical Approach, Impacts, and Accomplishments. Describe the technical approach taken by the project; results, stressing the most significant accomplishments and impacts.
- **Future Work** – Briefly state future activities anticipated or planned, with estimates of required scope to achieve or extend the project deliverables.
- **Impact on Laboratory or National Missions**. Briefly describe project connection and relevance to DOE and Laboratory missions; actual impact on projects including both (a) changes to direction of existing projects and/or (b) new work or new capabilities resulting from the project. Please include a statement regarding the source of funding for the primary research project.
- **Conclusions** Typical functions of the conclusion include (1) summing up, (2) a statement of conclusions reached as a result of accomplishments, (3) a statement of recommendations, and (4) a graceful termination. Any one of these, or any combination, may be appropriate for a particular paper.
- **References**
- **Appendix -- Special information indicating participants, etc.**

Project Report Paper, research paper format

- Introduction
  - Make the precise subject of the paper clear early in the introduction. As soon as possible, inform the reader what the paper is about. Depending on what you expect your typical reader already knows on the subject, you may or may not find it necessary to include **historical background**, for example. Include such information only to the extent necessary for the reader to understand your statement of the subject of the paper. As part of the background, you may also wish to include a **review of the relevant literature**.

Project Report Paper, research paper format

- Introduction, continued
  - Indicate the **scope of coverage of the subject**. Somewhere in the introduction state the limits within which you treat the subject. This definition of scope may include such things as the ranges of parameters dealt with, any restrictions made upon the general subject covered by the paper, and whether the work is theoretical or experimental.

Project Report Paper, research paper format

- Introduction, continued
  - State **the purpose of the paper**. Every legitimate scientific paper has a purpose that distinguishes it from other papers on the same general subject. Make clear in the introduction just what this purpose is. The reader should know what the point of view and emphasis of the paper will be, and what you intend to accomplish with it.

Project Report Paper, research paper format

- **Main body of the paper**
  - The discussion of your project and its outcomes. Include **scope and objectives, methods, results**, and other significant items in this section.
  - **Progress** - Technical Approach, Impacts, and Accomplishments. Describe the technical approach taken by the project; results, stressing the most significant accomplishments and impacts.
  - **Future Work** – Briefly state future activities anticipated or planned, with estimates of required scope to achieve or extend the project deliverables.
  - **Impact on Laboratory or National Missions**. Briefly describe project connection and relevance to DOE and Laboratory missions; actual impact on projects including both (a) changes to direction of existing projects and/or (b) new work or new capabilities resulting from the project. Please include a statement regarding the source of funding for the primary research project.

- **Conclusion**
  - Typical functions of the conclusion of a scientific paper include (1) summing up, (2) a statement of conclusions, (3) a statement of recommendations, and (4) a graceful termination. Any one of these, or any combination, may be appropriate for a particular paper.

Acknowledgements

- Acknowledgements

  The DOE requires that you include this statement in the acknowledgements section for both your report and your poster:

  – Community College Internships (CCI)

    - This project was supported in part by the U.S. Department of Energy, Office of Science, Office of Workforce Development for Teachers and Scientists (WDTS) under the Community College Internships Program (CCI).

Appendixes

- **Appendix.** Please provide the additional information requested below. The Appendix is in addition to the report Body above, and this content is not counted towards the six-page report limit.
  - **Participants-** In a table, list the names, institutions, and roles of each person who participated in the project, including host lab personnel, CCI, VFP, or SULI students, or other students, as appropriate. Include a brief statement of each participant's project team role.
  - **Scientific Facilities** - Briefly state if any scientific user facilities were part of your project activities, including identification of the facility.
  - **Notable Outcomes** - Publications, Reports, Manuals, Drawings/Schematics, Patents, or Presentations. List any articles, patent disclosures, laboratory technical reports, invited/contributed conference/workshop presentations, technical documents, and/or internal presentations resulting from activities performed under this appointment. Please include full bibliographical citations, co-authors, affiliations, titles, and/or venues, as appropriate.

"I," "we," and impersonal constructions (1)
--*AIP Style Manual*, pp. 14-15

- The old taboo against using the first person in formal prose has long been deplored by the best authorities and ignored by some of the best writers. "We" may be used naturally by two or more authors in referring to themselves; "we" may also be used to refer to a single author and the author's associates. A single author should also use "we" in the common construction that politely includes the reader: "We have already seen .... "But never use "we" as a mere substitute for "I," as in, for example, "In our opinion ... ," which attempts modesty and achieves the reverse; either write "my" or resort to a genuinely impersonal construction.

“I,” “we,” and impersonal constructions (2)

- The passive is often the most natural way to give prominence to the essential facts:

  Air was admitted to the chamber.

  (Who cares who turned the valve?) But avoid the passive if it makes the syntax inelegant or obscure. A long sentence with the structure

  The values of ... have been calculated.

  is clumsy and anticlimactic; begin instead with I [We] have calculated ...

“I,” “we,” and impersonal constructions (3)

- The author(s)" may be used as a substitute for "I [we]," but use another construction if you have mentioned any other authors very recently, or write "the present author(s)."

“I,” “we,” and impersonal constructions (4)

- Special standards for usage apply in two sections of a paper: (i) Since the abstract may appear in abstract journals in the company of abstracts by many different authors, avoid the use of "I" or "we" in the abstract; use "the author(s)" or passives instead, if that can be done without sacrificing clarity and brevity. (ii) Even those who prefer impersonal language in the main text may well switch to "I" or "we" in the acknowledgments, which are, by nature, personal.