Running head: 2013 DOE PD WORKSHOPS

2013 DOE-Sponsored National Laboratories

Professional Development Workshop

for Underrepresented Participants

Oak Rideg, TN

June 13-14, 2012

Evaluation Report

Susan Geier, MSEd

The 2013 CMD-IT National Laboratories Professional Development Workshop for Underrepresented Participants (CMD-IT NLPDev 2013) was held at the Oak Ridge National Laboratory campus in Oak Ridge, TN. from June 13 - 14, 2013. Sponsored by the Department of Energy (DOE) Advanced Scientific Computing Research Program, the primary goal of these workshops is to provide information about career opportunities in computational science at the various national laboratories and to mentor the underrepresented participants through community building and expert presentations focused on career success. This second annual workshop offered sessions to facilitate career advancement and, in particular, the strategies and resources needed to be successful at the national laboratories.

Assessment and Evaluation
The evaluation consisted of two phases: Phase I included three surveys administered during the two day workshop (pre-workshop, post sessions, and post workshop). The on-site surveys used a combination of rating scales and open-ended items. Workshop surveys were designed to gather participants': 1) demographics, 2) interest in careers at the national laboratories, 3) perceptions of factors that are important to their career decisions, 4) experiences with mentoring and the role of mentoring and institutional support in their professional development and 5) perceptions of their knowledge and abilities related to their career progression, including their knowledge and experiences with value creation and the proposal submission process prior to the workshop.

Participants were also asked about the value and relevance of the individual workshop sessions, as well as their overall impression of participating in a workshop for underrepresented minorities focused on the National Laboratories.

During Phase II, 9 months after the workshop, participants were invited to complete a web-based survey to allow attendees to expand on and add to their survey responses. The survey consisted of four open-ended questions related to: 1) continued interest in career opportunities at the national laboratories, 2) applying information received at the workshop to make progress toward career objectives, 3) how connections made at the workshop have assisted in their career progression and 4) their overall workshop experience and suggestions for future workshops and community building.

Of particular interest were the participants' perceptions of why careers at the national laboratories may or may not "fit" in their current and future career plans. Longitudinal tracking of participants is also planned for CMD-IT NLPDev attendees.

Participants
Twenty men (77%) and six women (23%) attended the 2013 CMD-IT NLPDev workshop. These participants were sponsored by the Department of Energy Advanced Scientific computing Research Program. Of the 26 respondents, sixteen (61%) of the participants self identified as African American/Black and six (23%) as Hispanic. The race/ethnicity and gender demographics are presented in table one. Most participants were affiliated with an educational institution (92%) and (more than half (53%) were doctoral students; see table 1. Two participants were persons with disabilities.

Table 1a

Demographics: Participants Race/Ethnicity and Gender			
n = 26	**Men**	**Women**	**Total**
African American / Black	11	5	**16**
Hispanic	6	0	**6**
Asian	2	0	**2**
White	1	1	**2**
Total	**20**	**6**	**26**

Table 1b

Demographics: Participants Institutional Affiliation and Rank				
n = 26	**University/ College/ Education**	**National Laboratory**	**Industry/ non-lab government**	**Total**
Associate Professor	4	0	0	**4**
Assistant Professor	4	0	0	**4**
Adjunct Professor	0	1	0	**1**
Postdoctoral Research Associate	1	0	0	**1**
Doctoral Student	14	0	0	**14**
Masters level	1	0	0	**1**
Lab Staff Member	0	0	1	**1**
Total	**24**	**1**	**1**	**26**

Ten month Post Survey Respondents

Twelve workshop attendees (46%) responded to the web-based follow-up survey sent in April 2014 (10 months after attending the workshop). Nine men and three women responded; six were graduate students, all were affiliated with universities except one person.

Interest in Careers at the National Laboratories

Participants were asked to comment about their interest in working at the DOE National Laboratories prior to the workshop and again after the workshop. The pre-workshop survey revealed that 54% of participants were interested in careers at the DOE Laboratories. All

respondents indicated that identifying research problems with societal implications was an important factor in their career decisions (table 2); additionally 92% of respondents wanted collaborate with interdisciplinary research teams; research careers within the DOE National Laboratories provide such opportunities. A majority of respondents came to this workshop hoping to learn about the National Laboratories and the associated career opportunities. As a result of participating in the workshop, 23 participants agreed they were more likely to consider/continue a career at a national laboratory (table 9).

Comments prior to the workshop:

> *"I will complete my PhD in computational Science by 2015 and I am in the process of learning more about the work conducted by the DOE at ORNL. I am keenly aware of the critical basic research and applications developed at these institutions and want to contribute in the development of these technologies. I do want to work for the NL it is my objective after my PhD."*

> *"[I hope]to manage research programs on structural health concerns or security issues of bridge infrastructure. The DOE NL would be a great place to explore … and be a part of quality research addressing areas of security and transportation infrastructure."*

> *"I hope to learn about the process of applying and succeeding at reaching my objective which is to be a researcher at a National Laboratory."*

> *"The question regarding research with societal impact resonates with me because I have a great motivation for making a positive difference in my community through my research endeavor."*

> *"I hope to gain a more firsthand view of what research is like at a National Laboratory. It would also be nice to engage with any researchers, if time permits, to get a sense of what life is like for them here."*

> *"I hope to gain a realistic understanding of what the DOE Labs are looking for in prospective associates..."*

The session about computational science research at the National Laboratories was well received by participants; Most (90%) received information from the presenters that will assist in their career path decisions and thought the session was valuable (see tables 4 and 5). Most also stated they received NEW information about careers at the DOE National Labs and thought the session motivated them to consider a career at the DOE Labs (95% and 89% respectively).

The session about navigating the professional ladder at the National Labs received high marks from the respondents. 95% of participants deemed the session valuable and relevant to their career progression (tables 4 and 5).

The presenters from both sessions shared a holistic perspective, based on their own diverse experiences, of the culture of the National Labs. These insights were coupled with career strategies specifically relevant to conducting research at the National Lab. The attendees also appreciated the informative Q & A segments of these sessions.

The workshop experience increased interest and commitment to pursue a career at the national laboratories for 86% of respondents. Others indicated a definite interest in research collaborations with the National Labs in the future. One participant needed more networking time in order to comment; another was still unsure of his career direction.

Representative *verbatim comments* about the most beneficial aspects of the Computational Science Research at the National Laboratories and Navigating the Professional Ladder Sessions follow (in quotations):

About the DOE National Laboratories:

"The individual talks helped to get a real sense of the differences and similarities in each location/lab."

"Very good discussions during Q and A about culture at the labs as it relates to management, life balance, etc."

"I learned about some of the computing tools available at the different labs as well as the types of research and research environment at the labs."

About the Professional Ladder:

"The formation of the professional ladder at the labs was very informative. I also liked the advice about value creation, about promoting yourself and your work, and about knowing the expectations and priorities of a research group."

[The session] "provided insight into ways of acting and demonstrating what is expected along the professional ladder."

About the Presenters:

"There were some pointers that will be very useful to my career progression. The presenters were extremely experienced in this subject."

"The motivational aspects of the panelists' experiences; they served as true inspirations."

"The speakers were very open and gave a good picture of the career path(s) at the different labs."

About Future Career Opportunities at the DOENL:

"I found the first talk to be particularly interesting because it dealt with some of the kinds of research in which I would like to be involved. Oak Ridge seems like the kind of place at which I would like to begin my career."

"I found the distinction between the academic environment and national labs to be very informative. It helped me understand the advantages of a career at a national lab vs. in an academic environment."

"[Learning about] the internship and post-doc opportunities at the labs, particularly the post-doc opportunities. The strength of focus on work in big data and high performance computing was a surprise, and may influence the directions I look to work in the future."

Representative *verbatim comments* about career interest in the National Labs immediately after attending the workshop (in quotations):

> **"Thanks to this event last year, I was able to do just that - secure a faculty appointment at LLNL! I recommend this program wholeheartedly and to everyone."**

> *"I was unsure if DOE supported the kind of research I performed but was happy to find out that they do! I am looking forward to finding post-doc opportunities at a national lab in my research area."*

> *"I came to the workshop to assess my opportunities and avenue to pursue a post doctoral position at a national lab. I believe the national laboratories offer a wealth of knowledge, very innovative and exceptional smart individuals, and the resources needed to perform groundbreaking science."*

> *"After conversations with fellow participants, lab employees and managers, panelists and organizers, I am convinced that there are opportunities available to me. I can also contribute to enrich the national intellectual wealth produced by the National Laboratories."*

> *"As a current industry employee, I am more likely now to pursue a career at a national lab. At the very least I plan on pursuing collaboration opportunities with contacts made at the workshop."*

> *"I now am very interested in including working at or collaborating with the national labs as a part of my professional career. Along with the work being done at the labs, the opportunities for broad collaboration and access to world-class facilities available are very attractive options to me."*

Career Interest in the National Laboratories Ten Months after the Workshop

Respondents were asked to comment about their interest in working at the DOE National Laboratories ten months after their participation in the June 2013 workshop. Respondent responses follow (12 responses):

- One participant spent the summer working at a National Lab after the 2013 workshop

- Three participants applied to the National Laboratories

- Three participants plan to apply to National Laboratories after completing their graduate degrees

- One participant assisted students to apply to National Laboratories

- Two participants explored the option of working at the Labs and will consider for future reference

- Two participants are interested in establishing research collaborations within the Labs

"Loved the opportunity; was able after the 2013 workshop to actually spend the summer working at Livermore … as a faculty researcher."

"As a result of last summer's workshop, I have decided to monitor research opportunities available at some of the National Labs (NLs). I have accelerated the pace of my dissertation work with aims at graduating in May 2015. My intention is to seek support from your group to apply for and obtain an opportunity to work either in an internship or for employment…"

"At the workshop I learned in great detail about the practical mission of the labs (and current lab employees). My current career plans include collaboration with Labs and I've identified which labs appear to have strong synergy."

Objectives for Professional Development

Participants were asked to rate the importance of various factors important for their career decisions. As mentioned all respondents considered engaging in research problems with societal implications to be important or very important factors in their career decisions. Finding a balance between work and personal life was deemed important by 96% of respondents. The majority of respondents (92%) agreed that participating in collaborative and interdisciplinary research teams, identifying a peer support network and identifying a professional mentor were also important career considerations (table 2).

Respondents were also asked what they hoped to gain from their workshop experience.   In addition to information about career opportunities at the National Labs, participants wanted to build professional networks, develop research collaborations and learn skills designed to enhance their career success especially related to obtaining funding.

Participants' comments follow.

"I would like to learn from other people experience. Also, I consider very important to build my networking with other peers."

"To network and learn how to encourage students to apply for NL research opportunities."

"To identify the different opportunities available at the NL and sharpen my writing and communication skills."

"I'm interested in learning more about research in computing outside the academic environment. And learn where the field is heading, the tools that I need to develop in order to compete and develop my career."

"I hope to build some of the skills I need to further my professional career particularly proposal writing and effective team management, since I hope to run my own lab some day."

"Meet fellow students and faculty with similar interests."

"Hope to gain some valuable insight on the operations of these labs and be able to make some great connections with other professionals."

Table 2

Factors Important for Career Decisions					
Pre-workshop survey	**N**	**Mean[1] (SD)**	**Important & very important**	**Somewhat Important**	**Not at all Important & somewhat unimportant**
How important is identifying research problems with societal implications?	26	4.58 (.504)	26 (100%)	//////	//////
How important is identifying a professional mentor?	26	4.46 (.647)	24 (92%)	2 (8%)	//////
How important is identifying a peer support network?	26	4.35 (.629)	24 (92%)	2 (8%)	//////
How important is participating in collaborative and interdisciplinary research teams?	26	4.50 (.648)	24 (92%)	2 (8%)	////////
How important is finding a balance between work and personal life?	26	4.54 (.582)	25 (96%)	1 (4%)	////////

1. Mean and standard deviation (SD) based on 5-point scale: Not at all important = 1, somewhat unimportant = 2, somewhat important = 3, important = 4, very important = 5

Making Connections: Mentoring and Networking as Professional Development Tools

Mentoring

Finding a professional mentor was considered important for 92% of participants (table 2); participants were asked what role mentoring has played in their professional progress to date. All respondents (n=26) recognized the importance of mentoring for their career advancement. While most of the respondents had mentoring relationships at various stages in their careers, five respondents did not have mentors although they were aware of the benefits of being mentored. Although the mentors discussed varied in role and influence many credited their 'mentoring circle' as instrumental to reaching academic and professional objectives. Some of the participants hoped to learn how to develop these supportive relationships at this workshop.

Benefit of Mentoring:

> *"I might not be who I am or where I am without the mentors I've been blessed to have. I have had a circle of individuals pushing me since my freshman year to pursue an advanced degree and to do good research. I also heard about this program through one of my mentors."*

"I have had the opportunity of having really good mentors through the course of my graduate studies, as well as presently in my post-doctoral position. It is a very crucial requirement for success in any discipline, especially science. I had people guiding me on how to be not just any other scientist, but a great one. I value the opportunity to get insight and advice from senior researchers."

"My mentoring experience at my academic institution has greatly affected my progress to date. I feel very fortunate to have an advisor who is very much involved in not only my research/educational progress but also my progress in professional development."

Lack of Mentoring:

"I have not had any mentor and this has been an impediment to me. I have had a PhD advisor but not a mentor. I have had to do all by myself sadly."

"I feel like the lack of mentoring in my quest to do more research has been very debilitating."

Looking for Guidance:

"In my pre-graduate experience mentors were very instrumental in helping determine career options and defining skills needed. In my graduate experience it's been more ambiguous…I'm in a place of lack of understanding in how to use mentors and gain mentor to help transition into jobs outside of academia."

"I do not have a professional mentor, but I understand the importance of one and would like some guidance on establishing and maintaining a professional relationship."

"Attendance at other minority workshops was valuable in providing insights."

Networking

Identifying a peer network was also considered important to almost all participants (92%); see table 2. A majority (69%) of participants intended to build professional networks and enhance research collaborations at the workshop. The workshop facilitated numerous opportunities to intermingle, formally and informally, with colleagues, panelists, and DOE Lab representatives. Networking was encouraged during meals and breaks as well as the research poster session.

The poster session provided a venue to highlight participants' research interests as well as allow constructive feedback from peers. Participants were mixed about the value of the poster session. Many respondents agreed they made connections at the poster session that will contribute to their career advancement (76%). The majority also agreed the poster session was valuable (76%). Fewer respondents (52%) agreed the session fostered research collaborations and 33% rated this session a 3 out of 5 thus this session received the lowest overall rating score of all the sessions (tables 5 & 8). Comments about the poster session indicated the networking opportunities, such as meeting the presenters and laboratories employees, and sharing research interests with colleagues were the most beneficial aspect of the poster session.

The connections made with such a talented and diverse group of colleagues was often cited as one of the most beneficial aspects of the individual sessions and the overall workshop. The majority of attendees were pleased with the format and frequency of the networking opportunities. A few wanted more networking time and more researchers from the labs at the poster sessions.

"[The beneficial aspects of workshop were] *"the personal connections I made to my peers and the presenters; you couldn't have this kind of success just by webinar or video recording it. The live experience is visceral and life-changing."*

"These are people that I barely met and yet now I feel such a personal connection to them that I believe we'll all be friends and colleagues for life."

"Because of the networking and community building opportunities, I was able to establish what could potentially be a future collaboration with another lab, AND I was able to possible secure a 3-month stint doing research in a lab here at Oak Ridge."

"The networking opportunities with the other participants and with the organizers were extremely valuable to me. I learned a lot about others' work in computational sciences, but just as importantly, I heard each of their feedback to my description of my own work, which has helped me understand how to present myself more effectively. I also found several opportunities for possible future collaborating with several participants."

The face-to-face time with the panelists is invaluable. When the time comes to apply at a National Lab, this exposure is highly enriching; you already know someone on the inside."

Ten month follow-up survey results about connections made at workshop
Respondents were asked about the connections made at the workshop and how the relationships developed had assisted them in their career progression. Most continued connecting with those they met at the workshop; a few appreciated the opportunity provided by the workshop but have not yet utilized the contacts for their career objectives.

Responses included: (11 responses)

- Seven participants mentioned the workshop enhanced their professional network and career opportunities in various ways

- One participant already new many at the workshop

- Two participants made connections but has not followed through

- One respondent was disappointed in the lack of responsiveness from those he contacted.

"I have gained a network of brilliant and arduous colleagues in HPC and other advanced science domains. I continue to utilize this network for research and other resources as I progress in my career, and they also utilize my expertise and experiences for the same purpose."

"I have stayed in contact with some of the workshop participants and panelists. During the workshop, I had the opportunity to speak at length with the workshop's keynote speaker, Dr. Leonard Napolitano, who kindly shared his own personal journey in NLs and suggested to contact him as I approach the completion of my PhD program. I intend to ask for his mentorship and to seek and pursue opportunities at these premier institutions, in particular, at Sandia, Lawrence Berkeley and Lawrence Livermore NLs. The accommodations arranged for us within Oak Ridge NL proper, were the setting for some of the most insightful and inspiring conversations I have had in my student life. The workshop participants with whom I interacted there truly impressed me with the depth and expansiveness of their thought in both global awareness and technological know-how. I clearly saw why diversity at the NLs is such a critical ingredient in the fabric of research and science."

"While attending the workshop, I had the opportunity to meet and network with a professor who works at the National Laboratory and is also an adjunct professor. Since attending the workshop, I have also learned that there are other professors who collaborate and conduct research with personnel working at the National Laboratories."

Perceptions of Institutional Support.

Survey questions in this area examined perceptions of acceptance and institutional support. 85% of participants stated they were comfortable sharing their views. Fewer felt their area of research was well accepted by colleagues at their institutions (77%) and that the leadership in their unit was supportive of their research interests (73%); see table 3.

Participants were also asked about the ways their institution contributed to their professional development. Almost all respondents received some type of institutional support from departments, colleges, or colleagues. Those who do not receive institutional support particularly value the opportunity to attend workshops like this one. This workshop provided a broad range of professional development support, specifically a community of talented scientists willing to candidly share their experiences to assist others with their careers. Attendees repeatedly commented, on the surveys and during the workshop, how much they appreciated the authentic dedication of the workshop organizers, presenters and the camaraderie among the attendees. 95% (all but one) respondent agreed that the session about effective strategies from a diverse perspective resonated with their experiences.

Participants' comments about institutional support:

"I have faculty and research advising as well as advising from my committee members. Also, there are several professional development resources through our graduate division."

"My advisor is very proactive in finding new opportunities for development (including finding this workshop) and pointing me toward people who I can collaborate with."

"There are some training opportunities; however, there are often battles over whether projects or overhead will pay for it. This, more often than not, means the training does not occur."

"greater exposure to non-academic career opportunities, such as all of the jobs available at National Laboratories, could really help foster my success and that of my peers."

"There is an unfortunate lack of involvement at the department head level and the Dean's level in regards to career progression. It's only through the efforts of my advisor, peers and this type of workshops that I feel a sense of possibility and empowerment."

Table 3

Perceptions of Institutional Support					
Pre-workshop survey	n	Mean[1] (SD)	Agree & Strongly Agree	Neither Agree nor Disagree	Disagree & Strongly Disagree
At my institution, I feel comfortable sharing my views.	26	4.08 (.628)	22 (85%)	4 (15%)	//////
At my institution, I feel my area of research is well accepted by my colleagues.	26	3.92 (.891)	20 (77%)	5 (19%)	1 (4%)
At my institution, the leadership in my unit is supportive of my research interests	26	3.85 (.834)	19 (73%)	5 (19%)	2 (8%)

1. mean and standard deviation (SD) based on 5-point scale: Strongly disagree = 1, Disagree = 2, Neither agree nor disagree = 3, Agree = 4, Strongly agree = 5

Knowledge and Abilities Considered Important for Career Advancement

The workshop offered several presentations, by expert panelists, related to pursuing careers at the national laboratories, the importance of establishing mentoring and networking relationships, as well as nuts and bolts strategies for career success.

Specific survey questions looked at participants' perceptions of their knowledge and abilities considered important to career advancement, especially related to careers at the DOE National Laboratories. Participants were asked to rate their 1) knowledge of computational science research and the professional ladder at the national laboratories, 2) knowledge and abilities related to teamwork including effective communication, leadership, and professionalism, 3) knowledge and abilities to obtain funding, including identifying funding opportunities, writing successful proposals and value creation, and 4) ability to make strategic connections with others for career enhancement including mentoring and networking.

The responses to the open-ended questions about experience with value creation and proposal writing suggested about 40% of participants had experience with proposal writing and few had exposure to value creation prior to the workshop.

Overall analysis of participant responses suggested that *prior* to the workshop; participants as a group rated themselves somewhat inadequate to adequate on factors associated with these topics. Ratings[1] ranged from 1.96 regarding knowledge about proposal opportunities within the Labs to 3.38 regarding professionalism. After the workshop, ratings[1] ranged from 3.88 regarding creating effective teams 4.46 regarding communicating effectively in the workplace.

 The *post* workshop survey revealed increases in perceived level of adequacy in all areas; moreover significant gains were found in perceived levels of adequacy related to knowledge and abilities related to establishing careers at the National Laboratories (table 4).

Below are summaries of participants' comments with representative quotations plus tables presenting the responses associated with the value and relevance of each session offered for the

participants' career advancement (tables 5 - 8). Quantitative response rates for the workshop post sessions ranged from 81% - 96%. The sessions with the highest percentage of positive responses are highlighted in **bold.**

Additionally, twenty-five of 26 participants (96%) responded to the overall feedback portion of the post-workshop survey (table 10). All participants agreed that: 1) the workshop was a valuable experience; 2) they were better prepared to advance their careers as a result of their participation; 3) they would recommend the CMD-IT NLPDev Workshop to their colleagues and 4) the topics were relevant to their professional success. Almost all respondents (96%). agreed the networking time was beneficial and plan to connect with colleagues from this conference for future collaborations. *Furthermore, 23 participants agreed they were more likely to consider/continue a career at a national laboratory as a result of participating in this workshop.* Open-ended item responses generally supported the ratings given in tables 5 - 9.

Ten month post-workshop survey results about making progress toward career objectives
Respondents were asked how they had applied the information received at the workshop to make progress toward their career objectives. All but one respondent had actively incorporated the strategies and techniques learned at the workshop to make progress toward their career objectives. Responses included:

Two participants attributed their successful proposal writing and obtaining funding to strategies learned at the workshop

Seven participants attributed their career advancement in part to attending the workshop

"Yes, I have used the information at the workshop - specifically pitching my work - to make progress towards my career objectives. I also used the experience to impart knowledge onto those that may not have experienced them yet, in hopes of fostering better opportunities at the DOE National Laboratories and life in general."

"My presentation strategies have greatly improved and also my resume writing has significantly improved. I have had a couple of phone call interviews from some big tech companies as a result. Yes, my resume did get their attention and I attribute that to the training we received."

"I have definitely added the information to my toolbox for various topics including presentation strategies, proposal writing, etc."

Open Response Summary for Individual Workshop Sessions

Computational Science Research at the National Laboratories

What specific aspects of this session were most beneficial for you? (20 respondents)

- Learning about the characteristics of the various laboratories and the diverse research being conducted, including the Q & A session

- Description of the positions available at the National Laboratories

- Information about research that could lead to collaborations

"The fact that the different panelists gave an overview of the research being done at the different national labs."

"1. How to progress with a career at the national labs. 2. Different work-environments at the different national labs. 3. the work/family balance."

"The discussion of the distinction between the type of work done at each lab, and the briefs on the major projects at them."

What specific NEW information relevant to your career progression did you gain from the session, if any? (18 respondents)

- Learned about the research content and research areas at the National Labs

- Learned about different career paths at the National Laboratories

"I learned about the graduate programs available for summer and other short term research opportunities I did not know about most of the opportunities presented."

"The importance of computational science in all aspects of science."

What additional information would you like about computational science research careers at the DOE National Laboratories? (19 respondents)

- In-Depth, tangible direction related to employment opportunities career offerings, application process, internships, and fellowships

- Information about research collaborations between NL and other entities, for example, academic and industrial institutions

- Resources for additional particulars about all the National Laboratories

Navigating the Professional Ladder

What specific aspects of this session were most beneficial for you? (20 respondents)

- Panelists holistic perspective of working at the National Laboratories

- The knowledge and advice from panelists about the organizational structure and culture

- Strategies for career advancement including Q & A session

"The information about the professional ladder at the labs was very informative. I also liked the advice about value creation, about promoting yourself and your work, and about knowing the expectations and priorities of a research group."

"The practical advice on career progression from Department managers and how to balance career and life"[were most beneficial].

What additional information resources would strengthen your research collaborations?
(13 respondents)

- Intimate details about life as a National Laboratories scientist, including how to get started

- All related materials (slides, etc.)

In what ways, if any, has this session (navigating the national laboratories professional ladder) AND the first panel about computational science research affected your interest in pursuing a career at the DOE National Labs? (19 respondents)

- Sessions gave a realistic and balanced perspective for career advancement within the labs

- Sessions presented a work environment welcoming diversity

"Knowing that the National Labs have formal career progression ladders in place, and knowing the specific research done at them has heightened my interest in working at one of the labs. The professional ladder, in particular, was encouraging because I now know that I will have extensive help and direction in progressing in my career."

"The interesting research areas available pique my interest. The fact that there are women at the DOE National Labs in (employed at) many levels of the professional ladder makes the labs attractive for career opportunities."

"It has certainly made me make up my mind and decision to work for the national Labs after I graduate."

Poster Sessions and Luncheon

What specific aspects of this session were most beneficial for you? (19 respondents)

- Networking

- Sharing research with colleagues

- Practicing professional development strategies

"Opportunity to share my research work and learn about areas where I can collaborate with a project team at one of the labs" [was most beneficial].

"Listening to the research of someone else on area that I am interested in getting involved with and listening to how others present their research" [were most beneficial].

"I was able to present and share my research with a number of people, increasing my confidence. I was able to gather lots of feedback that I will integrate in my research."

What additional information/resources would strengthen your research collaborations? (10 respondents)

- Logistics such as more time and broader audience from labs

"I was fortunate to speak with current employees who gave insightful information on life as a national lab employee. I would be interested in visiting and working on a project with someone at a lab. I feel this is a good way to do that."

Effective Communications

What specific aspects of this session were most beneficial for you? (21 respondents)

- The presenter and the active participation of the group
- Tangible strategies presented

"All of the very wise points that the speaker pointed out."

"The whole session was brilliant // it informed me about how to manage presentations and interviews."

"This workshop was extremely informative and contained a lot of practical tips that I can apply immediately and in the future."

What additional information would you like about effective communications? (13 respondents)

- Additional content such as audience specific presentations
- More resources consistent with of superb presentation

I'd listen to anything else Mr. Sadler had to say about communications // he was an amazing presenter and was very knowledgeable

Other comments about the sessions so far… *(8 respondents)*

- All positive comments

"Excellent workshop - better than last year (which was a hard match)."

"the Q&A sessions have been really useful so far, more so than the presentations; plus Bob is awesome!"

Professionalism and Leadership

What specific aspects of this session were most beneficial for you? (20 respondents)

- The candid, inspirational presenter and the 'real world' tips he shared
- Content that is meaningful to further career objectives

"I like the examples given by the speaker about his own experiences at ORNL. I believe the information shared in this session is very valuable for advancing my career."

[Most beneficial was] "the Q&A session where Jeff was able to field questions from the audience. Jeff's candidness was also very effective."

"Very inspirational and I did learn a lot - patience, persistence, and communication."

"There were many unconventional tips in this session that I'd never thought of before."

"Recognizing potential in people, being decisive after getting all needed information and dealing with the realities of a science career."

What additional information would you like about professionalism and leadership? (12 respondents)

- More specific strategies related to handling 'sticky' situations

- More strategies about establishing positive relationships in the workplace

- Additional perspectives from lab personnel in different roles

"A candid discussion about conflict handling within the work place. Dealing specifically with prejudices encountered, harassment, animosity, and blatant disrespect (from a leadership position)."

"Presentations from a broader perspective of personnel, for example, mid-level management and entry-level staff."

"Where/how does one start to develop these skills? How do you become a leader if you lack some qualities that will help you excel in a leadership role?"

Effective Strategies for Underrepresented Groups

What specific aspects of this session were most beneficial for you? (18 respondents)

- Panelists personal career journeys, especially non-traditional paths taken

- Specific networking strategies employed by the panelists

- Panelists presented a holistic approach to having a successful career at the National Laboratories

"One of the best sessions of this meeting. Very productive and stimulanting talks from the panelists."

"The panelists were extremely inspiring. Wayne Martin was exceptionally motivational and really made me believe that I can also achieve success."

[Most beneficial were]: "the need to always network and removing the fear of doing it; learning to effectively transition from one position to another and steps to take to ensure you will have a long and fruitful national lab career."

"The moderator asked a lot of questions that I found helpful since I had similar questions and I likely wouldn't have asked. The speakers were very candid and helpful with the experiences they shared."

What additional information would you like about this session's topic? (12 respondents)

- More about non-traditional career paths

- More interactive presentations dealing with making important connections

Effective Teams

What specific aspects of the session about effective teams were most beneficial for you?
(21 respondents)

- Novel, relevant strategies and tips presented including the book recommendation

- Informed advice from successful role models

"The individual stories. I also liked the variation in the panelist background."

"The whole session was educative and informative. No one taught or is teaching such principles in our PhD program."

"I enjoyed the examples of what not to do and projects that had difficulties. I also appreciated the book recommendation."

"All of the presenters gave useful information. Elisa Rodriguez's spiel on "No I in team" was very pointed and reminded us to take responsibility for ourselves."

What additional information would you like about the topic of effective teams? (11 respondents)

- More content about team management such as handling difficult situations and putting together teams that highlight complimentary talents

Proposal Opportunities

What specific aspects of this session were most beneficial for you? (18 respondents)

- Actionable strategies for obtaining funding: meeting with program managers, becoming a reviewer, proposal writing overview

- Description of the various funding opportunities

"The discussion was very helpful. I feel I learned a lot from the opportunities available within national lab."

"Very educative, especially for PhD students; this knowledge is not taught in grad school."

"Advice to get to know program managers, volunteer to read proposals, read winning proposals."

"Differences between proposals to different agencies/departments; the importance of engaging reviewers on page 1, as well as looking at and studying successful proposals; the risks/benefits of working with industry partners on proposals."

What additional information would you like about proposal opportunities? (12 respondents)

- Most requested more specific details especially more proposal examples

- One participant wanted proposal 101 info for more inexperienced attendees

LabTour

What specific aspects of this session were most beneficial for you? (22 respondents)

- Learning about the TITAN computer
- Q & A session with tour guide

"The tour allowed me to see firsthand observation of the supercomputer, while gaining more background into what it takes to function."

"The guide was very knowledgeable; he answered everyone's questions no matter what we were curious about regarding the supercomputer."

What additional information would you like related to the tour? (15 respondents)

- Learning about additional laboratories/equipment at the National Labs
- More details about how to access computing time at the National Labs
- One participant mentioned a printed brochure was available

Value Creation

What specific aspects of this session were most beneficial for you? (25 respondents)

- Specific techniques (NABC model) shared in an interactive format
- Relatable examples presented by an engaging presenter

"The NABC paradigm for pitching ideas and proposing research; it is simple but very effective and easy to implement."

"The business examples from his time working with HP were very illustrative and helped demonstrate how practical and effective the "NABC" model is in practice."

"Learning and practicing how to develop/craft and deliver one's value to a team and an organization."

"The presenter had a real knack for making it vivid through participation."

How will you apply the concept of value creation to your career progression? (21 respondents)

- Will incorporate techniques for tasks related to career advancement: negotiation, connecting with others about research, team building, etc.
- Will use to develop and execute proposal opportunities
- Will develop and practice elevator pitch

"When I describe my work to others (lab visitors, other faculty/researchers, my supervisors, etc.) I will use the advice Bob gave us, particular how to deliver information as a story and how to be aware of the priorities and values of my audience."

"...writing proposals for grants, internships, even cover letters for job applications; the stuff is priceless."

"It totally applies as the basis for networking, grant proposal writing, and generally building confidence in myself and my work, and it helped me understand how to write and format my dissertation proposal defense!!!!"

"It will take me some days to write a pitch for myself, but I will start by addressing the elements as an outline to begin with and share my pitch with friends for feedback."

Proposal Writing

What specific aspects of the proposal writing session were most beneficial for you?
(24 respondents)

- The knowledgeable presenter provided step by step instructions with 'insider' tips for successful proposal writing

- Specific aspects of proposal writing such as the budget, funder mission alignment, and reviewer criteria

"Understanding the requirements in a call for proposals, and the expectations and criteria of interest of the reviewers. Michelle also answered questions eagerly and gave us a wealth of information and tools to work with."

"Perfect! Concise and informative with "must do's" and "never do's"; she was very experienced!"

"This session was the second best session for the entire workshop; second to 'effective communication'. It was very informational and I will use it for writing my own proposal."

" I enjoyed the "tips" section of the presentation. These were subtle points to keep in mind and I hadn't heard this in previous proposal writing workshops."

How will you apply what you learned about proposal writing to your career progression (21 respondents)?

- Writing proposals for various purposes (research funding, dissertation, assist others)

- Follow specific techniques to improve proposal writing

"My challenge really has been in telling a story and establishing a case for why my research is of value in science. I think I will have to use the notes from the value talk and this talk to practice this activity."

"Outline, outline, outline! Get others to help you read and proofread; start early, finish early!"

"I will soon have to assist in writing proposals in my research group, and also in writing my own proposals, so understanding how to be competitive in doing so is invaluable. Michelle Buchanan did an excellent job presenting these skills and requirements to a rather diverse (by experience and field) audience."

"In my dissertation writing and defense and proposal writing for post doc opportunities."

What additional information would you like about proposal writing? (13 respondents)

- Examples of actual proposals and feedback

- Interactive segment to discuss techniques in small groups

- Copy of materials

"Showing a real proposal example and going through its different section, showing its weak and strong points."

"This session would be a little better if participants can get to practice some of the concepts discussed in real time or dissect examples of good and bad proposal."

"Dr. Buchanan covered the major points on proposal writing I had heard previously and added new perspectives. Thus I can't think of any additional information."

Overall Workshop Feedback

Post-Workshop Open Response Summary
How will you apply what you have learned at this workshop to your professional goals? (22 respondents)

- Incorporate all the strategies and techniques shared at the workshop to further career objectives

- Apply for career opportunities at the National Labs

- Enhance networking and mentoring opportunities by building on relationships established at the workshop

What were the most beneficial aspects of the overall workshop for you? (23 respondents)

- Networking with other attendees, panelists and laboratory associates

- "Advice and Q & A session from seasoned experts in STEM"

- Learning specifics about career opportunities at the National Labs

Please comment about your career objectives and your interest in working at the DOE National Laboratories in relationship to the information and strategies presented at this workshop. (23 respondents)

- 86% of respondents were interested in pursuing a career at the labs

- Some attendees looked forward to research collaboration with the NL scienctists

- One attendees already works at the labs

Please comment about the networking and community building opportunities provided by this workshop in relationship to your career success. (23 respondents)

- Made valuable connections that will facilitate career objectives, specifically obtaining a position at a National Lab

- Made valuable connections that will lead to research collaborations

- Became part of a community of talented colleagues for current and future endeavors

How does this workshop compare to other professional development workshops you have attended? Please describe. (24 respondents)

- 18 attendees thought this workshop exceeded other experiences particularly due to the quality of panelists, organization of the workshop, the unique aspects of the National Laboratories and the "smaller size and diversity in the background and career levels of the participants."

- This workshop was a first-time experience for 4 attendees.

- One attendee thought this workshop was "Targeted toward more senior graduate student audience or junior research/academic" rather than researcher from industry.

What improvements, suggestions, and topics can you suggest for future workshops? (22 respondents)

- Specific assistance and opportunities to apply for positions at the labs

- More facilitation for research collaboration and mentoring opportunities

- Participants mentioned wanting shorter days and more days without giving up content

- More interactive sessions

Table 4

Self-ratings of Knowledge and Abilities Important to Career Advancement					
Pre / Post Matched Responses	Pre-Workshop Mean[1](SD)	Post Workshop Mean[1](SD)	t	df[3]	Sig[2]
1. How would you rate your knowledge of computational science research at the national laboratories?	2.33 (.868)	4.13 (.537)	10.537	23	.000
2. How would you rate your knowledge about the professional ladder at the national labs?	2.04 (.878)	4.17 (.576)	9.660	22	.000
3. How would you rate your ability to effectively communicate in the workplace?	3.29 (.806)	4.46 (.658)	6.584	23	.000
4. How would you rate your ability to create effectively teams?	2.79 (1.062)	3.88 (.900)	3.606	23	.001

5. How would you rate your knowledge about leadership?	3.08 (1.152)	4.20 (.764)	4.661	24	.000
6. How would you rate your knowledge about professionalism?	3.38 (.970)	4.25 (.737)	3.842	23	.001
7. How would you rate your knowledge about obtaining proposal opportunities within the National Labs?	1.96 (.806)	3.92 (.974)	8.862	23	.000
8. How would you rate your ability to *write* a successful research proposal?	2.44 (.961)	3.96 (.735)	7.006	24	.000
9. How would you rate your understanding of the elements of value creation?	2.22 (1.043)	4.26 (.689)	7.562	22	.000
10. How would you rate your ability to develop a circle of mentors?	2.28 (1.021)	4.00 (.913)	7.562	24	.000
11. How would you rate your networking capabilities to enhance your career success?	2.52 (.770)	4.28 (.737)	10.007	24	.000

1. Mean and standard deviation (SD) based on 5 point scale: inadequate = 1, somewhat inadequate = 2, adequate = 3, very adequate = 4, exceptional = 5
2. $p<.05$(2-tailed);
3. one attendee did not participate in the post survey

Table 5

<table>
<tr><td colspan="6">Post Sessions Survey Responses
Comparison of mean responses and frequencies per question across presentations</td></tr>
<tr><td colspan="6">1. This session was valuable for my career progression.</td></tr>
<tr><td></td><td>n</td><td>Mean[1] (SD)</td><td>#SA+A/%</td><td># N/%</td><td>#SD+D/%</td></tr>
<tr><td>Computational Science Research at the National Laboratories</td><td>21</td><td>4.14 (.793)</td><td>18 (86%)</td><td>2 (9%)</td><td>1 (5%)</td></tr>
<tr><td>Navigating the Professional Ladder</td><td>21</td><td>4.76 (.539)</td><td>20 (95%)</td><td>1 (5%)</td><td>//////</td></tr>
<tr><td>Poster Sessions and Luncheon</td><td>21</td><td>4.00 (.949)</td><td>16 (76%)</td><td>3 (14%)</td><td>2 (10%)</td></tr>
<tr><td>Effective Communications</td><td>21</td><td>4.90 (.301)</td><td>21 (100%)</td><td>//////</td><td>//////</td></tr>
<tr><td>Professionalism and Leadership</td><td>21</td><td>4.52 (.512)</td><td>21 (100%)</td><td>//////</td><td>//////</td></tr>
<tr><td>Effective Strategies for Underrepresented Groups</td><td>21</td><td>4.43 (.746)</td><td>18 (86%)</td><td>3 (14%)</td><td>//////</td></tr>
<tr><td>Effective Teams</td><td>23</td><td>4.52 (.665)</td><td>21 (91%)</td><td>2 (9%)</td><td>//////</td></tr>
<tr><td>Proposal Opportunities</td><td>22</td><td>4.14 (.560)</td><td>20 (91%)</td><td>2 (9%)</td><td>//////</td></tr>
<tr><td>Value Creation</td><td>25</td><td>4.44 (.583)</td><td>24 (96%)</td><td>1 (4%)</td><td>//////</td></tr>
<tr><td>Proposal Writing</td><td>23</td><td>4.78 (.422)</td><td>23 (100%)</td><td>//////</td><td>//////</td></tr>
<tr><td colspan="6">1.based on 5-point scale: Strongly agree (SA) = 5, Agree (A) = 4, Neither agree nor disagree (N) = 3, Disagree (D) = 2, Strongly disagree (SD) = 1</td></tr>
</table>

Table 6

Post Sessions Survey Responses *Comparison of mean responses and frequencies per question across presentations*					
2. The information I received from the presenters (colleagues) will assist me in my career development.					
	n	Mean[1] (SD)	#SA+A/%	# N/%	#SD+D/%
Computational Science Research at the National Laboratories	21	4.29 (.644)	19 (90%)	2 (10%)	//////
Navigating the Professional Ladder	21	4.76 (.539)	20 (95%)	1 (5%)	//////
Effective Communications	21	4.86 (.478)	20 (95%)	1 (5%)	//////
Professionalism and Leadership	**21**	**4.48 (.512)**	**21 (100%)**	//////	//////
Effective Strategies for Underrepresented Groups	21	4.48 (.814)	19 (90%)	1 (5%)	1 (5%)
Effective Teams	23	4.52 (.665)	21 (91%)	2 (9%)	//////
Proposal Opportunities	22	4.36 (.658)	20 (91%)	2 (9%)	//////
Value Creation	25	4.36 (.700)	22 (88%)	3 (12%)	//////
Proposal Writing	**23**	**4.70 (.470)**	**23 (100%)**	///////	//////

1.based on 5-point scale: Strongly agree (SA) = 5, Agree (A) = 4, Neither agree nor disagree (N) = 3, Disagree (D) = 2, Strongly disagree (SD) = 1

Table 7

Post Sessions Survey Responses					
Comparison of mean responses and frequencies per question across presentations					
3. I can apply presented strategies to my career objectives.					
	n	Mean[1] (SD)	#SA+A/%	# N/%	#SD+D/%
Navigating the Professional Ladder	21	4.57 (.676)	19 (90%)	2 (10%)	//////
Effective Communications	**21**	**4.90 (.301)**	**21 (100%)**	//////	//////
Professionalism and Leadership	21	4.29 (.784)	17 (81%)	4 (19%)	//////
Effective Strategies for Underrepresented Groups	21	4.48 (.814)	19 (90%)	1 (5%)	1 (5%)
Effective Teams	23	4.48 (.665)	21 (91%)	2 (9%)	//////
Proposal Opportunities	22	4.18 (.664)	19 (86%)	3 (14%)	//////
Value Creation	25	4.44 (.651)	23 (92%)	2 (8%)	//////
Proposal Writing	**23**	**4.65 (.487)**	**23 (100%)**	//////	//////

1.based on 5-point scale: Strongly agree (SA) = 5, Agree (A) = 4, Neither agree nor disagree (N) = 3, Disagree (D) = 2, Strongly disagree (SD) = 1

Table 8

Post Sessions Survey Responses
Comparison of mean responses and frequencies per question across presentations

4. On a scale from 1 to 5, 5 being the best, my overall rating is:

	n	Mean[1] (SD)	#5&4/%	# 3/%	#2&1/%
Navigating the Professional Ladder	21	4.57 (.676)	19 (90%)	2 (10%)	//////
Poster Sessions and Luncheon	21	3.88 (.740)	14 (67%)	7 (33%)	//////
Effective Communications	**21**	**4.90 (.301)**	**21 (100%)**	//////	//////
Professionalism and Leadership	20	4.55 (.510)	20 (100%)	//////	//////
Effective Teams	23	4.54 (.582)	22 (96%)	1 (4%)	//////
Proposal Opportunities	22	4.18 (.588)	20 (91%)	2 (9%)	//////
Value Creation	25	4.40 (.707)	22 (88%)	3 (12%)	//////
Proposal Writing	**23**	**4.74 (.449)**	**23 (100%)**	////////	//////

1.based on 5-point scale: 1 – 5; 1 = lowest rating through 5 = best rating

Overall Workshop Feedback

Table 9

CMD-IT NLPDev 2013: Overall Workshop Feedback					
	n	Mean[1] (SD)	#SA+A/%	# N/%	#SD+D/%
1. The CMD-IT NLPDev workshop was a valuable experience.	25	4.84 (.374)	25 (100%)	//////	//////
2. I am better prepared to advance my career as a result of my participation.	25	4.80 (.408)	25 (100%)	//////	//////
3. I would recommend the CMD-IT NLPDev workshop to my colleagues.	25	4.88 (.332)	25 (100%)	//////	//////
4. The networking time was beneficial.	25	4.76 (.523)	24 (96%)	1 (4%)	//////
5. The presenters addressed topics that were relevant to my career objectives.	25	4.64 (.490)	25 (100%)	//////	//////
6. I received NEW information relevant to my career success	25	4.68 (.557)	24 (96%)	1 (4%)	//////
7. I plan to connect with colleagues I have met at this conference for future collaborations.	25	4.64 (.569)	24 (96%)	1 (4%)	//////
8. The tour was a valuable experience	25	4.20 (.866)	20 (80%)	4 (16%)	1 (4%)
9. I plan to pursue a summer internship at a national laboratory.	**18[2]**	**4.50(.707)**	**16 (89%)**	**2 (11%)**	//////
10. I am more likely to consider/continue a career at a national laboratory as a result of participating in this workshop.	**23[3]**	**4.74 (.541)**	**22 (96%)**	**1 (4%)**	//////

1. based on 5-point scale: Strongly agree (SA) = 5, Agree (A) = 4, Neither agree nor disagree (N) = 3, Disagree (D) = 2, Strongly disagree (SD) = 1
2. 7 respondents selected Not Applicable for this item
3. 2 respondents selected Not Applicable for this item

Respondents were overwhelmingly positive in their overall assessment of the workshop. Most of the suggestions offered for future workshops were related to having more of what the workshop was offering. More time, more examples, more interaction with panelists, more access to laboratory personnel. Participants appreciated the opportunity to be part of this excellent experience as reflected in these representative comments:

Comments about the Overall Workshop Experience

"This workshop was very diverse in the information presented, but was well organized and therefore the information could be absorbed and synthesized very well. The panels were very engaging and they complimented each other well."

"This workshop was a phenomenal success from my perspective. The participants were all very interesting to talk to, very eager to participate and had valuable input."

"Outstanding! I made some invaluable connections that will benefit my career and my continued graduate studies."

"The details about work and professional opportunities at the National Labs have made me reconsider my career goals to now include working at them at some point. The professional skills (value creation, effective communication, creating effect teams, etc._ I will incorporate into helping me achieve my goals, milestones and research."

Ten month post-workshop survey results about overall workshop experience
Respondents were asked to comment about their overall workshop experience and to offer suggestions for future workshops and community building. Their follow-up responses were consistent with the positive feedback collected during the workshop. Moreover, the workshop experience continued to have an impact on career preparation and advancement.
One respondent stated:

"My participation in this workshop has greatly motivated me to accelerate the completion of my academic goal in computational science. It has put me in contact with like-minded minority students and professionals who have the potential to bring important contributions to these institutions. An important portion of the speakers you featured in Oak Ridge NL were inspiring professionals from traditionally under-represented minorities. This made a big impression on me. We can and must put forth our best effort to participate in this vital national resource. I am personally invested in serving as ambassador of our profession to young high school and college students to pursue STEM careers. Please do continue to invite and motivate under-represented participants and speakers to your door-opening workshops. I would be happy to assist in your efforts, if given the opportunity. Finally, I truly believe that the connections made there, point us to life-changing paths in our personal development and growth, and this in turn is transferred to our social and professional communities. Thank you."

Conclusion

This review of the data suggests the 2013 CMD-IT National Laboratories Professional Development Workshop for Underrepresented Participants was well received by attendees. They gained effective strategies and resources to facilitate career advancement and indicated a heightened interest in career possibilities at the National Laboratories. In addition, the attendees established connections with talented peers that can enhance the existing community of diverse and excellent computing scientists. The organizers incorporated suggestions from last year's evaluation report such as providing a tour of the Laboratory; the 2013 attendees valued this addition.

Post-session and post-workshop responses indicated the workshop objectives were met; specifically, imparting knowledge about careers at the National Laboratories, building community to foster mentoring and networking and sharing tangible strategies to facilitate career success. The workshop objectives were also aligned with what attendees stated they hope to gain from attending the workshop. Ultimately the workshop was a success based on these criteria. Furthermore, almost a year after participating in the workshop, respondents indicated a lasting positive effect in terms of career progression.

In general, attendees were pleased with their experiences and indicated the workshop was relevant and meaningful. Some wanted more exposure to lab personnel instrumental in the hiring process; others wanted format changes ranging from shorter days to longer time to network etc. Any sessions that included interactive, group activity were given high marks. The Q & A sessions were also cited as valuable aspects of the various sessions. Below are a couple suggestions/requests made by the participants and the evaluator's related comments (e*valuator comments are italicized):*

1. Some attendees, especially graduate students, wanted more detailed, hands-on assistance with the application process for career at the national laboratories including information about internships, fellowships, qualifications needed, contact information at various labs. Something more personal beyond the "website" offered. They requested tangible, specific, actionable steps to connect with national lab recruiters.
   Could CMD-IT act as clearinghouse for links, resources, and contact information exchange? Is this beyond the scope of this workshop?

2. Some attendees had hoped the poster session would have greater attendance in general and specifically more Laboratory personnel in attendance. *The value of this session received mixed results. Some attendees did not value this session while others made important connections for their career.*

3. *Longitudinal tracking of participants is also recommended for current and future attendees.*

4. *Well Done! I though the organizers did a tremendous job of engaging attendees and sharing valuable information. I agree with one attendee's assessment:* **"This workshop was a phenomenal success from my perspective. The participants were all very interesting to talk to, very eager to participate, and had valuable input. Whatever criteria were used to recruit and select participants was obviously well created.**