

# Bridging the gap: increasing collaboration between research mentors and career development educators for PhD and postdoctoral training success

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**ABSTRACT** National reports and funding mandates have called for trainee-centered PhD and postdoctoral training and the need to support diverse career outcomes. As a result, career and professional development (CPD) resources have expanded at several institutions. Despite the growth of innovative and impactful CPD resources, access to and awareness of resources have been inconsistent and inequitable for graduate and postdoctoral trainees. In the current model, core education occurs in two unconnected ways: faculty research mentors provide scientific competencies training, while CPD educators provide transferable competencies training, which is separate from the curriculum and optional at most institutions. Research mentors are influential in supporting trainee engagement with CPD programs; however, most are either unaware of the rapidly growing opportunities or may not see the direct benefit to scientific development and productivity. Due to this disconnect, some trainees can be inadvertently distanced from CPD resources, leading to more inequities among groups. To bridge this gap, here we propose a realignment of the current model via a set of practical and collaborative solutions providing benefit to all stakeholders. With greater awareness and collaboration, research mentors and CPD educators can complement each other's expertise to better support trainee experiences and outcomes.

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**Growth of New Resources and Inequities in Graduate and Postdoctoral Training:** Over the past decade, leaders in STEM education have called for career and professional development (CPD) to become an essential part of PhD and postdoctoral training (Denecke *et al.*, 2017; Hitchcock *et al.*, 2017; Committee on Revitalizing Graduate STEM Education for the 21st Century *et al.*,

2018; Committee on the Next Generation Initiative *et al.*, 2018; Bixenmann *et al.*, 2020; Brandt *et al.*, 2020; Mitic and Okahana, 2020). CPD education programming and resources target transferable competencies essential for academic, scientific, and career success. These competencies can directly benefit lab productivity and operations as trainees develop and refine communication, management, interpersonal, and leadership skills. As a result, institutions have rapidly hired CPD educators (Graduate Career Consortium Benchmarking Committee, 2019) with advanced degrees to deliver professional skills and career planning training that complement existing training delivered by faculty research mentors.

CPD educators develop and manage multiple programs and possess strategic expertise in what matters for success in exploring and pursuing diverse career paths. CPD educators understand workforce and labor market trends and can access resources for all aspects of career preparation and application. A small sample of programs provided in the authors' institutions and competencies covered are listed in Table 1.

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Institution	Program Name	Competencies Covered
Washington University in St. Louis	SCC	Communication <ul style="list-style-type: none"> <li>o Communicating with diverse audiences</li> <li>o Writing, editing, &amp; speaking</li> </ul>
	L-MAP	Management skills <ul style="list-style-type: none"> <li>o Budgeting &amp; resource management</li> <li>o Time management &amp; productivity</li> </ul>
University of Michigan Medical School	You <sup>3</sup>	Leadership <ul style="list-style-type: none"> <li>o Inclusivity &amp; professionalism</li> <li>o Negotiation &amp; self-advocacy</li> </ul>
	BCDP	Interpersonal <ul style="list-style-type: none"> <li>o Teamwork &amp; conflict management</li> <li>o Self-awareness &amp; mitigating implicit bias</li> </ul>
University of Texas Southwestern Medical Center	UT CEN	Career exploration & preparation <ul style="list-style-type: none"> <li>o Career exploration &amp; job search</li> </ul>
	SEALS	Commercial acumen & hiring practices

SCC, Science Communication Credential; L-MAP, Leadership & Management in Action Program; You<sup>3</sup>, Postdoc Leadership & Management Program: You, Your Team, Your Project; BCDP, Biotech Career Development Program; UT CEN, UT System Career Exploration Network; SEALS, Students Emerging Academy of Leadership.

**TABLE 1:** Examples of CPD programs and competencies covered in one or more of these programs.

However, access to CPD resources is often inconsistent and inequitable for graduate students and postdoctoral trainees (collectively referred to as trainees henceforth). In the current apprenticeship model, scientific training is situated at the center and professional skills training at the periphery of education frameworks. Trainees bear the burden of navigating these two disparate education systems. This burden is further increased because, at many institutions, CPD training is considered optional and sometimes exists within the hidden curriculum (Hariharan, 2019; Calarco McCrory, 2020). As a result, trainees are often unaware of campus CPD resources, while others lack support from research mentors to fully engage in CPD opportunities or are unable to balance research with CPD engagement (Fuhrmann, 2016; Sauermaun and Roach, 2016). The hidden or peripheral nature of CPD curriculum can also reveal deep inequities in overall trainee experiences, exacerbated in women and underrepresented minorities (URM) (Gibbs *et al.*, 2014; Lambert *et al.*, 2020). Trainees from nonminoritized backgrounds navigate and understand hidden curricula better than trainees who are minoritized and/or underrepresented due to race, gender, ethnicity, ability, first-generation college, and other variables (Hariharan, 2019; Calarco McCrory, 2020).

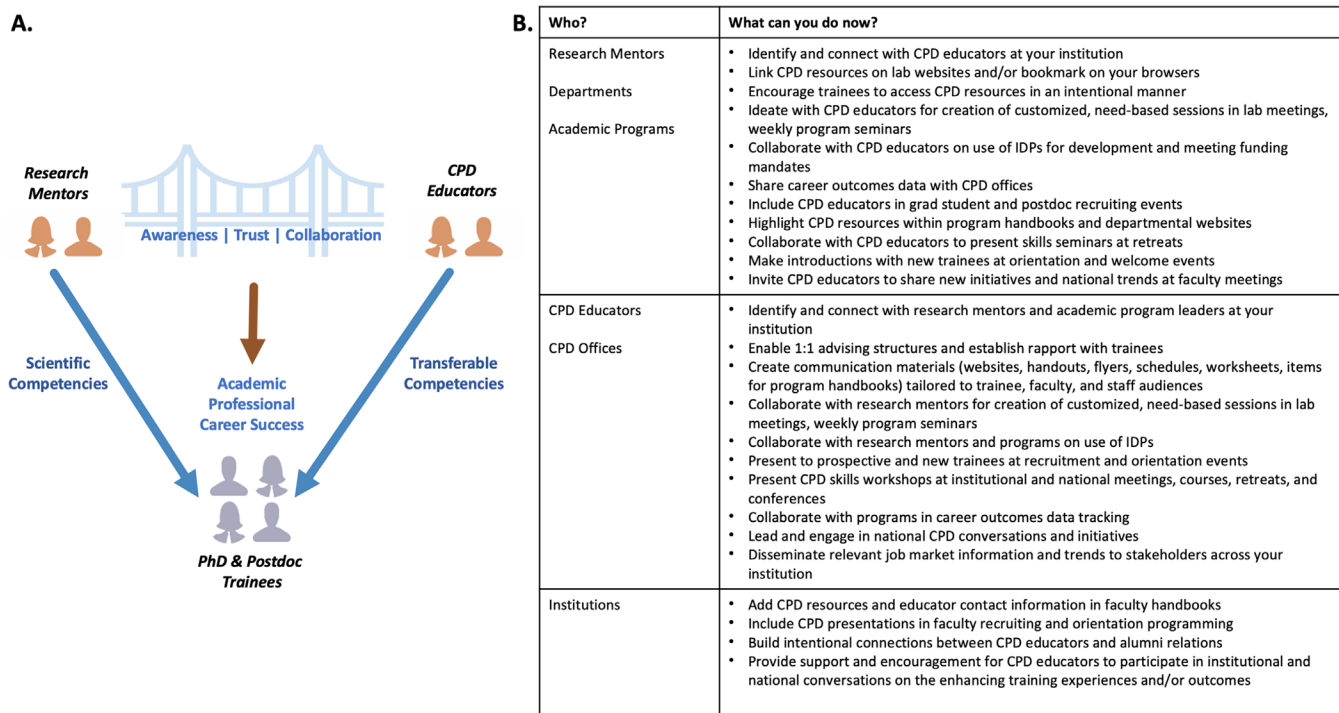
Generating a structured curriculum that integrates the “hidden” CPD programs into the core curriculum, along with the visible scientific curriculum and adding built in checkpoints to help trainees make progress and stay on track, is the ideal goal. Importantly, although many institutions have begun modernizing curriculum by integrating CPD into core training such as the National Institutes of Health (NIH) BEST-funded program (Lenzi *et al.*, 2020) at the UMass Chan Medical School, curriculum transformation at that level tends to take a long time and has many hurdles. Waiting to enact changes until core curricular transformations are approved significantly disadvantages current trainees who need our support today.

*In this article, therefore, we propose a set of no-cost, practical, and collaborative solutions for research mentors and CPD educators, providing benefit to trainees, research mentors, and institutions in the immediate timescale.* Such a new realigned model of training can intentionally bridge the gap between scientific and CPD training, improving awareness, access, and agency for PhD and

postdoc trainees to participate in CPD as a first step toward a broader transformation of core curricula.

**Simple Solutions to Bridge the Gap for Better Trainee Experiences and Outcomes:** We propose a realignment of the current training paradigm so that faculty research mentors can intentionally leverage CPD educators’ expertise to benefit their trainees and lab productivity. Within this realigned model, CPD educators can more easily connect and collaborate with faculty mentors. Figure 1A portrays the realigned model and includes a comprehensive list of no-cost action items (Figure 1B) to bridge the gap between scientific and CPD training. Faculty research mentors can influence and support trainee engagement with CPD programs, leading to more equitable outcomes for trainees. First-gen trainees, URM trainees, and other marginalized groups especially value and benefit from robust CPD connections, as recently published (Lambert *et al.*, 2020). However, research mentors themselves are often unaware of the rapidly growing CPD resources at their own institutions or may not see the direct benefit of CPD training to scientific development and productivity. At the same time, CPD educators can initiate connections with faculty research mentors and program leaders to customize training offerings to meet institutional needs. By working together, scientific mentors and CPD educators can collaboratively provide equitable and enhanced learning experiences for all our trainee scientists.

CPD educators across institutions welcome opportunities to connect and collaborate directly with faculty research mentors on an individual level. However, few formal mechanisms exist to make introductions between faculty research mentors and CPD educators, let alone build collaborations. At our own campuses we use a proactive approach to build effective relationships with faculty, academic programs, and departments, which manifest in improved ways of supporting trainees. Successful partnerships and relationships emerge from CPD educators being invited to speak at orientations, new student/postdoctoral trainee welcome sessions, and at faculty meetings, as well as from invitations to design and deliver custom workshops at lab meetings or to attend student-run seminars and work-in-progress talks. We are also available to participate in academic and social events including retreats, symposia, and conferences.



**FIGURE 1:** (A) Bridging the gap: The current gap between research mentors and CPD educators can be filled via awareness, trust, and collaboration to meet trainee needs for enhanced academic, professional, and career success. (B) Specific action items for research mentors, departments, academic programs, CPD educators, CPD offices, and institutions to bridge the gap.

We often encourage trainees to consider CPD educators in their team of mentors (Levine, 2020), but we need research mentors to empower trainees to find and utilize CPD educators as a core resource. Therefore, we recommend that faculty embolden their trainees to actively and intentionally engage in CPD activities for 1) just-in-time-learning, 2) coaching-based advice (examples: conference talk, fellowship application, CV feedback, immediate issues such as time management), and/or 3) lifelong skill building (examples: communication, conflict management, teamwork, networking, etc.). We welcome faculty to brainstorm with us on topics most pertinent to their individual needs.

We recommend highlighting CPD programs and associated websites as well as their contact information in new faculty orientation materials as a key resource for tenure track faculty and their re-

search groups. Departments can add events to their calendars and weekly digests while also hyperlinking information and resources on their own websites. Such measures convey to trainees that departments and research faculty value CPD educators as critical elements of support in the education landscape. CPD educators can connect with research mentors and tailor CPD communication materials to faculty, student, and staff audiences.

**Bridging the Gap Benefits Multiple Stakeholders:** Active partnerships between research mentors and CPD educators benefit not only individual trainees as described above but also stakeholders in multiple aspects of the graduate training and education lifecycle, from those recruiting new graduate students and postdocs to alumni, early career faculty, and professional societies (Table 2).

Stakeholder	Potential outcomes of bridging the gap between research mentors and CPD educators
Current trainees (PhD and postdoctoral scientists)	<ul style="list-style-type: none"> <li>Increased research productivity with project and time management skills</li> <li>Better training experiences via collaborative, interpersonal, and mentorship skills</li> <li>Professional and career competitiveness with communication and networking skills</li> </ul>
Research mentors and thesis advisors	<ul style="list-style-type: none"> <li>Lessened burden to support trainees on transferable and nontechnical competencies</li> <li>Build trustworthy channels to consult with CPD educators for situational issues</li> <li>Well-informed and substantiated mentoring and trainee support statements for funding opportunities</li> <li>Support for Early Career Researchers (ECRs) to focus their time on research and funding toward tenure</li> </ul>
Future trainee recruits	<ul style="list-style-type: none"> <li>Seek a positive culture of professional development and career preparation - beyond websites and handouts</li> <li>Clear differentiator when weighing multiple offers</li> </ul>
University/program ecosystems	<ul style="list-style-type: none"> <li>Drive equity in training experiences</li> <li>Break silos for collaboration and efficiency</li> <li>Enhance funding (e.g., training grants)</li> <li>Strengthen alumni engagement</li> </ul>

**TABLE 2:** CPD educators and research mentors working together benefits recruiting through alumni relations.

CPD educators have a large stake in graduate school recruiting cycles and activities. Most applicants seek—and expect—CPD resources when choosing a PhD program or postdoctoral training site. Preliminary data from informal postacceptance surveys in two umbrella PhD programs (Washington University in St. Louis and University of Michigan) show that 54–74% respondents indicate availability of professional development opportunities as an important factor in their decision to accept the PhD offer. Our recent empirical experience supports these data. A large fraction of prospective trainees, during PhD interviews, specifically asked about availability and access to structured career planning and professional skill-building activities and about optimum timelines for engagement in professional skill-building programs and career preparation. Faculty who are well acquainted with us and our programs find it easy to share this information during recruiting events. This is advantageous outside the immediate interviews, as applicants communicate with each other over social media, discussing the presence of CPD in the graduate school and how it is valued.

Such a collaborative structure also enables postdoctoral and PhD alumni to give back to institutions as well as to national and international scientific and professional societies by volunteering to speak on panels or in workshop events and by earmarking donations and gifts. In many of these engagements, our alumni denote research training as well as the nonresearch support and training they received in our graduate and postdoctoral training as being pivotal to their success. Thus, support from CPD educators begins at recruiting and extends all the way to alumni relations, impacting the entire arc of training and beyond.

Additionally, the resources and knowledge of CPD educators directly support faculty in our institutions. As we support trainees' development of professional competencies, this frees up time for junior faculty to pursue their immediate needs for funding and publication opportunities. Many external funding opportunities, including T32 training grants, now require trainee CPD, the use of individual development plans (IDPs), and collecting and disseminating robust outcomes data. By making CPD educators, whose expertise lie squarely in these areas, major partners for education, our institutions will be more competitive for federal funding.

Thus, collectively, the small changes we recommend in the training culture (Figure 1B) cost nothing to implement, and many stakeholders have much to gain through these collaborations.

**Easy First Steps to Bridge the Gap:** The actionable measures we share here are the early steps toward improving training equity, experience, and overall career outcomes catalyzing larger culture change. We sincerely thank those who already collaborate and communicate with us and are excited to create new relationships with research mentors. We also strive to build new connections while strengthening existing ones with research mentors and program leaders.

We welcome all graduate and postdoctoral research mentors to explore training options in their immediate spheres, if you have not already, and encourage you to add us as a new contact or reach out for a conversation. We will be delighted to hear from you, learn about your specific needs, and work to support you and your trainees. When we become acquainted, we learn personally how each of us contributes to training the future scientific workforce, and we can collaboratively work toward “our shared goal” of supporting trainees from all backgrounds. By building a culture of trust and open communication to leverage each other's strengths in the academic arena, we can lean on one another to enhance institutional culture.

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