Overview

Faculty in the Department of Cognitive Science represent multiple disciplines in the behavioral, social, biological, and computational sciences. Because of this, a uniform rubric for evaluating all of our faculty is neither sensible nor fair. The second section explains considerations for evaluations in the main disciplines represented in the department, even though individual faculty breadth and interdisciplinarity is a critical component of their quality, uniqueness, and impact. First, however, we explain general principles and practices of evaluation for merit and promotion.

Scholarship. Regardless of discipline, evaluation of scholarship emphasizes *quality* and *impact* more than any quantitative measures of productivity. Quality is assessed by discipline-specific experts (within and beyond UCSD). We expect all faculty to produce and communicate innovative, rigorous, highest-quality scientific scholarship that has far-reaching empirical and/or theoretical implications. This scholarship is expected to meet or exceed state-of-the-science standards for theoretical rationale, quality of planning, methodological rigor, and transparency.

We expect scholarship to have the potential to impact relevant disciplines. We acknowledge that impact is difficult to assess, especially for recent work, and difficult to compare across disciplines. However, for promotion evaluations we request discipline-specific experts both within and outside the department to comment on current and potential impact of their work, and to explicate the criteria used in their evaluation.

The nature and format of scholarship in the department is quite variable. Faculty in some areas communicate their best work in peer-reviewed conference proceedings; those in many areas publish detailed research reports in peer-reviewed journals; others publish theoretically substantive books. Also, we acknowledge and value scholarship in the form of well-documented products: for example, computational resources or methodological innovations that can propel, transform, or amplify other scientific efforts.

Most of our constitutive disciplines rely upon collaboration. Although some faculty work on problems in which a talented individual alone can still make substantial progress, many work on problems for which that traditional model is infeasible. Thus, ability to form and maintain productive collaborative projects is, for many, a necessary skill for scientific success. The department therefore recognizes effective collaborative efforts and leadership, especially in innovative interdisciplinary projects, while also continuing to recognize and value rigorous and insightful individual scholarship.

Teaching

Pedagogical excellence is expected at both the undergraduate and graduate level. Faculty courses are evaluated by other faculty for intellectual rigor, importance for training future scientists where relevant, innovation (of content and of effective pedagogical approaches), and effectiveness. Quality and appropriateness of content are considered.

To evaluate teaching, classroom observations and teaching portfolios will be used whenever possible. Student evaluations are considered, but primarily for *consistent* positive or negative

comments. Faculty are expected to read comments and narratives, and to address repeated, substantive complaints about objective and correctable practices.

We do examine CAPE scores. Converging evidence, however, indicates that student class ratings are an invalid measure of teaching efficacy. Thus, the department does not consider CAPE scores to be a valid measure of teaching effectiveness, especially when the number of evaluations is so limited that it necessarily reflects an idiosyncratic and/or self-selected sample. The department will attempt to provide some evaluation and contextual information when a candidate has consistently received very high or very low evaluations; such contextual information might, for example, include CAPE scores from other instructors' attempts to teach the same course, and information about the student composition of particular courses or sections. Our department has developed its own student rating questionnaire, but currently we lack evidence of its validity and reliability; nevertheless, we might report such scores in lieu of (if not in addition to, CAPE scores, especially when our internal evaluation instrument has yielded more responses. Given the the absence of a valid, comparable metric of student learning, evaluations and comments (solicited or unsolicited) from former students also will be included in the candidate's file.

Cognitive Science is not a traditional discipline, so there is no standard curriculum across programs in North America where undergraduate degrees are granted. Rather, our department has developed undergraduate and graduate curricula that are high-quality, forward-thinking, and tailored to our strengths. But this process carries additional challenges: Most faculty invent their classes or reinvent more traditional classes. Many cannot use textbooks or other existing course materials because none exist. Some faculty have invested extraordinary effort - usually without credit or reward - in developing, piloting, and refining novel and forward-looking courses. Our approach is to constantly imagine and re-imagine what the next generation of interdisciplinary scholars will need to know. This process of imagining, re-imagining, and refining inevitably is realized as an unpredictable, changeable, and quirky process. We have learned that innovation requires some trial and error before uniform success is achieved. Faculty are therefore given reasonable opportunities to address shortcomings identified in early efforts, as they develop or revise a course. Attempts to improve teaching should be described and documented by the candidate, along with any evidence of success (or, if ongoing, plans to evaluate success).

Junior faculty with some exceptions do not develop new courses in their first review cycle, and this is not a rigid expectation for tenure. In addition, junior faculty are given course relief in their first year and occasionally as they approach tenure.

Some faculty teach courses that are labor-intensive (e.g., project-based courses); if such courses are not given added teaching credit, the fact will be acknowledged and considered in evaluating total teaching effort during a review period. Excepting such courses and formal teaching-release agreements (first year, fellowship/grant constraints, university-committee leadership, departmental teaching needs) all faculty are expected to carry an equivalent teaching load (3 undergraduate and 1 graduate course yearly).

Effective research mentoring of junior scholars - graduate students and postdoctoral scholars - is also evaluated for its impact on academia and industry. Evaluations will be solicited

from current and former scholars who were mentored by the candidate. Comments or narratives from graduate students (both mentees and students in graduate seminars) will be included in the file. Mentoring is defined to include students from other departments and programs who, for some faculty, represent significant effort *and* substantial impact in the form of new PhDs with unique interdisciplinary training and expertise. Effective graduate and postdoctoral mentorship is a necessary metric of teaching effectiveness, with the following caveats: first, junior faculty especially in their first review or two might have little evidence of mentorship. Second, by virtue of area of research and funding trends, some faculty members mentor more graduates and postdocs than others. Thus, although all faculty, especially senior faculty, are expected to be effective, consistent, and supportive mentors, expectations about the *amount* of mentorship in not uniform across areas. Third, it is recognized that junior scholars are in a vulnerable position when providing negative feedback about a mentor, and so ancillary information about problems in mentorship (that do not breach confidentiality) can be added by the chair or DGS. Related to this, the department recognizes that effective mentorship includes creating an environment -- within the seminar room, the lab, and department functions -- where *all* junior scholars, regardless of gender, ethnicity, or other factors, feel safe, supported, and equally valued. Documented behaviors that degrade such an environment are not tolerated in the department, and will be considered to negatively impact a candidate's mentorship effectiveness. Fourth, it is recognized that when the number of former mentees is small, feedback might be sparse, especially because busy junior scholars do not always respond to our requests for evaluations, and because anonymity of responses is nigh impossible. Therefore, in cases where there is minimal information about mentorship, the chair will describe the circumstances and indicate whether any meaningful inferences can be drawn concerning mentoring effectiveness. Mentorship need not be limited to a primary research advisor. Finally, Teaching Professors will have reduced expectations for research mentoring, but nonetheless are expected to play some role (e.g., serving on thesis committees), especially in promotion actions. In addition, Teaching Professors are expected to play a role in mentoring graduate students in teaching methods and skills.

In both undergraduate teaching and graduate/postgraduate mentorship, identified areas of weakness in previous reviews should be addressed in at least the next review. Efforts to remediate weaknesses should be explained by the candidate and evaluated in the department letter.

Because Cognitive Science is interdisciplinary, team-teaching - though historically atypical - is acknowledged as a potentially unique and engaging pedagogical experience. In team-taught courses, it is presumed that all faculty will participate fully and interact extensively with all students. The agreement regarding teaching credit should be documented. Team-teaching arrangements are at the chair's discretion.

Teaching Professors are also expected to maintain consistently high-quality instruction across their courses, but especially in core service courses. Teaching Professors are expected to take an active role in curriculum development and pedagogical improvement, especially in our undergraduate program. Such an "active role" might take different forms (e.g., training TAs and IAs, curriculum development, organizing and producing teaching resources; evaluating and

implementing new teaching technology) but it is expected that Teaching Professors will plan and coordinate these department-enhancing efforts with the chair and other department faculty, taking ongoing teaching needs into account.

Finally, although pedagogical research has not historically played a large role in our scholarly output, as teaching professors and full-time instructors assume a proportionally greater part in our curriculum, we will evaluate pedagogical research or resources both for scholarly/scientific value (with respect to the candidate's scholarship), and for its instructional impact, in the event that the work has been implemented in courses.

Service

Cognitive Science faculty are expected to engage in annual service to the department, the university, and their discipline(s). Concretely, the department expects junior faculty to serve on one departmental or university committee per year, and to show some contribution to their discipline (e.g., reviewing for journals or conferences).

Tenured faculty are expected to play a substantial service role in the department and in the university or system. This expectation can be modified, by agreement with the chair (as specified in an MOU), if a senior faculty is committed to one or more highly demanding roles in a professional, campus-level, or system-wide service capacity (e.g., president of a large academic society; chair of campus AS or UCAS). In such cases, the negotiated relaxation of other service expectations will take into account any other accommodations (e.g., teaching release).

Because our faculty are interdisciplinary scholars, often with unique interdisciplinary expertise, they often receive many service requests and end up with greater than normal service commitments. These efforts can have disproportionate impact on research and scholarship. Exceptional efforts to build scholarship, among other exceptional efforts (e.g., leadership roles in AS or the UC system) are given special consideration in promotion and evaluation.

Finally, faculty service can include efforts to promote and broaden STEM education, and efforts to increase participation by underrepresented groups in cognitive science and its constituent disciplines (see also next sub-section).

Diversity, Equity and Inclusion

The department expects that all faculty will demonstrate a commitment to diversity, equity, and inclusion. The forms of this commitment vary considerably, and might include – but are not limited to -- outreach efforts, mentoring students from underrepresented populations, or explicitly designing research to make it more inclusive. The department recognizes efforts to promote inclusion and diversity in research, teaching, and service (including outreach). Such efforts can also involve populations that are not traditionally recognized in definitions of diversity (e.g., differently-abled populations, including individuals with developmental, psychiatric, motor, or neurological disabilities). Exceptional efforts to promote inclusion and diversity at UCSD, in the UC system, or in the individual's field are factored into departmental evaluations.

The department strongly supports the words and spirit of UCSD's Principles of Community, and expects all faculty members to personally demonstrate and support actions that are

consistent with those principles. The department will not condone or excuse conduct by any faculty that violates these principles of community. That is, harassment or abuse by any faculty member of any member of the university community or affiliate is not tolerated.

Evaluation of Research and Scholarly Products

General Considerations

Most of our successful faculty historically have contributed at least two significant products (e.g., journal articles, competitive proceedings papers, etc.) per year within a normal merit review cycle. Typically the candidate would have played a significant role (i.e., first or senior author) on at least some of these products. This number varies considerably, however, based on a number of factors. Some factors that the department explicitly considers include the following:

- Discipline or area of research: productivity metrics are somewhat different across areas (see below).
- Productivity is scaled for magnitude of products: number of unique products will likely be somewhat smaller when a book or monograph has been completed during the review period, or when efforts have been focused on a major research project constrained by intrinsic factors (e.g., longitudinal projects; extensive overseas fieldwork; recruitment of rare patient population samples).
- The department follows university guidelines for evaluating off-scale or accelerated actions; teaching and service record will be considered in addition to research and scholarship achievements. The latter will be evaluated in comparison to disciplinary-specific expectations, as outlined below. In cases where a candidate's record is stronger than necessary for a normal step advancement, but does not quite rise to the level of a recommendation for off-scale adjustment, a half-step bonus may be considered.
- Volume of output is evaluated in light of quality, novelty, and potential impact. Publication volume is evaluated with respect to the quality and impact of the outlets: slightly lower productivity can be offset if most papers are substantive papers in top-tier journals; higher-than-average productivity, conversely, might not receive special consideration if the work is in lower-quality journals or includes less substantial papers (e.g., preliminary work; brief reports or opinion papers).
- Junior faculty in their first review cycle might have marginally lower productivity.
- Senior faculty are expected to show intellectual leadership in the form of substantial, discipline-impactful publications on which they are senior or first author. For senior faculty in disciplines that rely considerably on collaboration and have looser standards for making senior faculty co-authors, a higher number of papers may be expected in each review period; this might be as much as double the expected number, and would likely include both senior authored and Nth-co-authored papers. Alternatively, the candidate can offer evidence of the indispensability of their contribution, regardless of their authorship order.

- Rare events outside of the candidate's control that negatively, substantially, and inevitably impacted productivity (e.g., building or construction problems causing a prolonged pause in research) can be considered. In such cases the candidate's statement and the chair's letter should detail the circumstances and the extent to which productivity was impacted. An MOU should be included in the file.

In all cases, an individual's productivity is calibrated to a comparison set of same-cohort scholars in the same discipline in top tier programs around the world (corrected for inequities in teaching responsibilities).

In all cases, faculty are asked to specify their contribution to every scholarly product reported in their BioBib. Because our faculty engage in such varied forms of scholarly activity, and many work in areas where collaboration is necessary, we require these specifics, and might request more detail from a candidate when their individual contributions remain unclear.

As noted above, pedagogical research by Teaching Professors or regular FTE faculty will be evaluated for scientific and scholarly merit, independent of its possible impact on the candidate's teaching. The department does not necessarily expect Teaching Professors' research to focus on pedagogy, nor does it devalue pedagogical research by FTE faculty: in all cases, quality of scholarship is evaluated independent of the faculty member's appointment series.

More generally, Teaching Professors will be evaluated using differently calibrated criteria due to their relatively high teaching load. For example, publication productivity for Teaching Professors is not expected to be more than half of a traditional FTE faculty, relative to rank and area/methodology of research.

Area-Specific (Disciplinary) Considerations

Most of our faculty span disciplines and so their CVs almost invariably look atypical for any one discipline - it is common, in fact, for faculty CVs to resemble a hybrid of two or even three disciplines. Nevertheless, some pertinent disciplinary differences can characterize and contextualize the variability across our faculty's portfolios. Understanding these differences permits more meaningful evaluation of what "excellence" looks like across our department. Below we consider in alphabetical order the main areas represented by our faculty.

A note on methodology: in 2017 an *ad hoc* committee assembled lists of outstanding tenured researchers in each area (8-12 individuals per area), from our department, other UC campuses, and other top Research I universities.[1] Several concrete and public metrics of productivity and impact were compiled; that database is available for examination upon request.

A note on publication outlets: Because our faculty's research is so diverse, a survey of recent publications would reveal scores of different outlets. Thus, for merits and promotions the department relies on experts in the candidate's discipline to comment on the quality and

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[1] Criteria for selecting individuals: (1) is tenured or would likely be tenured in our department; (2) CV or other comprehensive record of scholarship was available; (3) career trajectory was similar to at least some of our faculty; (4) does regular teaching and graduate training at levels comparable to UCSD.

selectivity of publication outlets. Those comments will be summarized in the department's action letters.

• *Computational Modeling:* Faculty publish in a wide variety of journals and proceedings, not only in the content area relevant to the computational work (e.g., *Cognition*, *Developmental Science*, *Journal of Neuroscience*) but also in outlets dedicated to computational methods *per se* (e.g., *IEEE Intelligent Systems*) and to computational modeling in constitutive disciplines (e.g., *Advances in Neural Information Processing Systems*, *International Journal of Computer Vision*, *Neurocomputing*). Proceedings of some highly competitive conferences may be as high (or higher) impact than some traditional journals, but this is quite variable. More than in other areas, impact factor can indicate the degree to which an approach or algorithm has proven successful and/or has been adopted. Thus, products (in the form of software, algorithms, etc.) will be considered alongside other scholarly output, and evaluated for quality, innovation, and impact. However, not all faculty will necessarily release, e.g., compiled software or patentable procedures, so such products are not an obligatory form of scholarship at any rank. Books and monographs are a relatively rare (though occasionally high-impact) type of outlet, and are not expected at any career stage. Note that because Cognitive Science computer scientists have a higher teaching load than CSE faculty, expectations for research productivity need to be scaled accordingly.

• *Developmental Science:* Faculty publish mainly in specialized journals or general psychology or neuroscience journals. Because research with infants or childs is necessarily slower than comparable research with adults (due to difficulties of recruitment, testing, data variability, etc.), data generation is slower. Also, some developmental questions can be addressed only through longitudinal designs that can require months or years for core data collection. This can further impact productivity. However, the potential uniqueness and scientific utility of such datasets can be high. Developmental science (cognitive/behavioral) is a relatively small discipline with less funding and slower publication cycles, so short-timescale metrics of impact (e.g., 5-year citation counts) are weak indicators; many papers in this domain reach their citation half-life more than a decade after publication. Researchers occasionally have papers in competitive conference proceedings (e.g., *Boston University Child Language Development*, *Cognitive Science Society*, *ICDL-EpiRobotics*), but these are less common overall, and typically have less impact than peer-reviewed papers. Developmentalists occasionally publish books and monographs; one monograph series (of the *Soc Res Child Dev*) is high impact and visibility. However, books are not a necessary metric of impact even for senior faculty, although a well-regarded volume can have a substantial contribution.

• *Human-Computer Interaction and Design:* Faculty in these areas have distinct profiles of scholarly outlets and products. Although a few journals are high-profile (e.g., *Human Computer Interaction*, *ACM Transactions on Computer Human Interaction*), most impactful research is published in conference proceedings (e.g., ACM CHI, CSCW, UIST). Competitive conferences post their acceptance rates, and many have 'best paper' prizes that can further indicate the perceived innovation and expected impact of a research project (note that many other disciplines within our department do not use such prizes as conventional metrics of success). Although HCI proceedings papers are typically shorter than conventional journal articles, they

often report on a system or product (software, hardware, or a web-based system) that itself is a vital component of the scholarly contribution. Faculty are therefore evaluated based on both their products (broadly construed) and on the reported research and scholarship concerning these products. In the case of software, the number of downloads or visits to web-based apps is used as indicator of impact of a system.

HCI faculty often participate in collaborative projects; nevertheless we expect faculty, at both junior and senior levels, to publish research in every cycle in which they played a leadership role. In addition, because our HCI faculty have a higher teaching load than Engineering faculty at other institutions or industry researchers who do comparable research, expectations for productivity are scaled accordingly.

• *Linguistics, Anthropology, and Philosophy:* Some Cognitive Science faculty represent these social sciences. These faculty often publish in relatively specialized outlets with smaller audiences and therefore (necessarily) lower mean impact statistics. In some sub-fields (e.g., in linguistics) peer-reviewed and competitive conference proceedings are common; in other sub-fields (e.g., biological anthropology; psycholinguistics) empirical scientific journals are common. The wide variety of empirical efforts in these fields is also considered: some research questions (in, e.g., linguistics or anthropology) can only be carried out by researchers visiting distant sites; the inherent difficulties of data collection will be taken into account on a case-by-case basis, in making judgments about expected productivity.

A distinction can be drawn between subfields with publication models similar to the social or biological sciences (e.g., experimental linguistics), and subfields with more theoretical work that is more akin to humanities scholarship. Thus, monographs and books will be more common for faculty aligned with some fields, for example philosophy and linguistics. In some subfields, publishing scholarly books with competitive publishing houses is a metric of senior standing. When a book or monograph is under contract, this will be considered in the individual's productivity during the cycle in question, and the individual will be expected to provide evidence of the product. Because books have the greatest impact if widely reviewed, formal reviews (but not, e.g., informal lay-reviews or compiled ratings) will be considered.

As a more general policy, scholarly books will be considered for their merits and potential impact regardless of the field in which the author primarily works. Because of the interdisciplinary nature of our department, scientific books or other products that synthesize and present a novel, broader view of some problem or area in the cognitive sciences will be evaluated in personnel reviews.

• *Neuroscience and Cognitive Psychology:* Faculty publish largely in peer-reviewed neuroscience journals, but also publish a few proceedings, books, or chapters. Research outlets are diverse, spanning core areas of neuroscience as well as biology, medicine, and psychology. Because Cognitive Science neuroscientists have a much higher teaching load (4 full classes/year) than the majority of neuroscience and medical faculty, research productivity should be scaled accordingly in peer comparisons.

Neuroscience faculty, like HCI, often participate in collaborative research, and are expected for every review cycle to publish new research and scholarship in which they played senior and/or

central roles. Researchers using cognitive psychology methods traditionally work in smaller teams on projects that are less technically and resource demanding; however, in order to encourage faculty to address limitations of traditional research methods, we allow for some trade-off between productivity and novelty/innovation.

Expectations at Different Steps

Prior to tenure, each review should demonstrate new scholarly products; initially (and potentially even after tenure) these products will likely include a combination of work begun before joining UCSD and work since joining UCSD. The ratio might be weighted toward the former in the first review cycle, but it would be of concern if little or no work initiated at UCSD was represented in the second pre-tenure review. However, the expected ratio should be contextualized by the expected time to complete research of the sort being carried out. Other measures of probable near-future productivity can be considered in the first review. In any case, scholarly productivity is expected even in the first review. For teaching professors, the volume of output is expected to be lower, but some productivity is expected in all or nearly all review cycles.

The department attends to, and addresses, standard APM, PPM, and UCSD guidelines for promotion: in addition to expert evaluation of the excellence of scholarly product and discipline specific metrics of productivity, evidence of consistently effective instruction and mentorship, rank-appropriate service, and commitment to inclusion and equity, we consider, for promotion to Associate Professor, evidence of growing national and international stature and regard within the relevant discipline(s). The nature of such evidence will be specified by senior faculty within the discipline, but it might include comments from external letters, invitations for service to the field and participation in scholarly events, requests for the individual's expertise (in reviewing, consulting, etc.), etc. For promotion to Full Professor, we seek evidence of solid international regard and reputation for scholarship as well as leadership in the field, as attested by external referees and by a history of participation and contribution of various forms including the above examples, as well as activity and service consistent with a senior role in the field: for example, regular invitations to give talks, editorial and/or conference-organizing positions, granting agency review panels, professional society leadership, etc. Scholarly honors, prizes, awards, etc., are additional indicators of impact and accomplishment that factor into our overall assessment.

For Teaching Professors, expectations about research productivity and scholarly reputation are somewhat attenuated, but there should be evidence of continued efforts to produce scholarly publications as a senior or a collaborating author. Promotion to Associate and Full Teaching Professor will also require evidence of regular and active efforts to play leadership roles -- in pedagogy, in training or scholarly activities (e.g., organizing workshops or special issues) beyond the campus, and/or in scholarly professional organizations or journals.