May 24, 2021

Mr. William Covey
United States Patent and Trademark Office
Office of Enrollment and Discipline

VIA ONLINE SUBMISSION

Re: IPLAC Comments on Proposed Administrative Updates to the General Requirements Bulletin for Admission to the Examination for Registration to Practice in Patent Cases Before the United States Patent and Trademark Office, Response to Docket No. PTO-P-2021-0005

Dear Mr. Covey:

The Intellectual Property Law Association of Chicago ("IPLAC") appreciates the opportunity to provide comments to the United States Patent and Trademark Office ("USPTO") in response to the proposed "Administrative Updates to the General Requirements Bulletin for Admission to the Examination for Registration to Practice in Patent Cases Before the United States Patent and Trademark Office" as originally published on March 23, 2021 in the Federal Register (FR Doc. 2021-05940).

Founded in 1884, IPLAC is the country's first and oldest bar association devoted to intellectual property matters. Located in Chicago, a principal locus and forum for the nation's authors, artists, inventors, scholarly pursuits, creativity, research and development, innovation, patenting, and patent litigation, IPLAC is a voluntary bar association including several hundred members with interest in the areas of patents, trademarks, copyrights, and trade secrets and the legal issues they present. Its members include attorneys in private and corporate practices before federal bars throughout the United States, the USPTO, and the U.S. Copyright Office. IPLAC offers the following comments and suggestions regarding the proposed administrative updates to the general requirements for admission to the examination for registration to practice in patent cases before the USPTO.

A. IPLAC Agrees with Adding Common Category B Degrees to Category A (Proposal 1)

IPLAC respectfully agrees that the common Category B Degrees listed in the Federal Register should be added to Category A.[1] The common Category B degrees that are routinely considered equivalent to Category A degrees include: "Aerospace engineering, bioengineering, biological sciences, biophysics, electronics engineering, genetic engineering, genetics, marine engineering, materials engineering, materials science, neuroscience, ocean engineering, and textile engineering."[2]

Expanding these commonly granted degrees found in Category B would increase equity by eliminating the double standard that occurs when determining the level of

[1] *See* FR Doc. 2021-05940, p. 15468.
[2] *Id.*

scientific and technical training between Category A and Category B applicants. A Category A applicant is considered to possess "the necessary scientific and technical training if he or she provides an official transcript showing that a Bachelor's degree was awarded in one of [the Category A subjects]."[3] However, Category B applicants not only must "possess scientific and technical training equivalent to that received . . . in one of the subjects listed in Category A"[4] but also prove it through their grades across all technical areas.[5]

By allowing Category A applicants to only rely on the name of their degree in order to show they possess the necessary scientific and technical training, Category B applicants under the current system are at a significant disadvantage despite receiving scientific and technical training from top universities with more science and math credits than some Category A applicants. One example is the difference in course requirements between Biological Sciences (Category B) and Biology (Category A). To graduate with a Biological Sciences degree at the University of Notre Dame, a student must take at least 2 semesters of Introductory Biology, 2 semesters of Calculus, 4 semesters of Chemistry, and 2 semesters of Physics.[6] However, the University of Pennsylvania ("UPenn"), a peer school also ranked in the top 20 national universities according to *US News and World Report*,[7] only requires the following courses for its undergraduate

[3] *General Requirements Bulletin for Admission to the Examination for Registration to Practice in Patent Cases Before the United States Patent and Trademark Office*, Office of Enrollment and Discipline (OED), 1, 3 (Apr. 2021), https://www.uspto.gov/sites/default/files/documents/OED_GRB.pdf.
[4] *Id.* at 4.
[5] *See id.* at 5 ("*Only courses with a grade of C- or better will be accepted.*") (emphasis in original).
[6] *See Biological Sciences Sample Curriculum*, UNIVERSITY OF NOTRE DAME COLLEGE OF SCIENCE, https://science.nd.edu/undergraduate/sample-curricula/biological-sciences-sample-curriculum/ (last visited Apr. 29, 2021).
[7] *See 2021 Best National University Rankings*, U.S. NEWS & WORLD REPORT, https://www.usnews.com/best-colleges/rankings/national-universities (last visited Apr. 29, 2021).

Biology major: Introductory Biology, Chemistry, Additional Chemistry and/or Physics, Calculus and/or Statistics.[8] Under the Additional Chemistry and/or Physics section, Biology majors at UPenn are able to meet this requirement by taking "Any Chem from the above list" in the Chemistry section.[9] Further, UPenn Biology majors may satisfy the Calculus and/or Statistics requirement by taking a single Calculus course and a single statistics course.[10]

As a result, UPenn Biology majors can graduate with a degree in Biology and sit for the patent bar examination under Category A without ever taking a physics course or even two semesters of calculus. Meanwhile, Biological Sciences majors at the University of Notre Dame are required to take two semesters of physics *and* two semesters of calculus in order to graduate. As a result, it could be inferred that Biological Sciences majors have a greater amount of the required "scientific and technical training" in order to sit for the patent bar examination than Biology majors. However, due to the difficulty of Calculus II and Physics courses,[11] some Biological Sciences students may obtain a grade of C- or below in those courses yet still qualify for the degree. These low grades would prevent Category B applicants who majored in Biological Sciences from sitting for the patent bar examination, even if their scientific and technical coursework overall is more rigorous than their Category A peers for whom grades are not taken into

[8] *See Requirements of the General Biology Major*, PENN ARTS & SCIENCES DEPARTMENT OF BIOLOGY, https://www.bio.upenn.edu/undergraduate/current-students/major-requirements (last visited Apr. 29, 2021).
[9] *Id.*
[10] *Id.*
[11] *See* Colleen Flaherty, *Momentum in Physics Ed*, INSIDE HIGHER ED (Dec. 3, 2019), https://www.insidehighered.com/news/2019/12/03/new-approach-teaching-introductory-physics-first-holds-some-promise ("Math, specifically calculus, is a barrier to many natural sciences . . . . Physics, which is math-heavy, often proves similarly challenging to students who wish to pursue STEM degrees.")

account to qualify for admission for the patent bar examination. For at least these reasons, we agree that common Category B majors that are routinely accepted by the USPTO, such as Biological Sciences, should be added as Category A majors.

IPLAC also suggests and recommends adding Engineering Mechanics to the list of Category A Degrees. This degree is offered by elite universities, including the University of Illinois Urbana-Champaign,[12] the University of Wisconsin-Madison,[13] and John Hopkins University.[14] According to the University of Illinois, "Engineering Mechanics is the basis of all the mechanical sciences . . . . [it] provides the 'building blocks' of statics, dynamics, strength of materials, and fluid dynamics . . . . [and is] devoted to the solution of mechanics problems through the integrated application of mathematical, scientific, and engineering principles."[15] The Engineering Mechanics degree is ABET accredited[16] and requires numerous courses in math, physics, statics and dynamics, theoretical and applied mechanics, and chemistry. Accordingly, this degree provides candidates with the necessary scientific and technical background in order to competently present or prosecute patent applications before the USPTO.

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[12] *BS in Engineering Mechanics*, THE GRAINGER COLLEGE OF ENGINEERING, MECHANICAL SCIENCE & ENGINEERING, https://mechse.illinois.edu/undergraduate/bs-engineering-mechanics (last visited Apr. 29, 2021).

[13] *Engineering Mechanics, B.S.*, UNIVERSITY OF WISCONSIN-MADISON ENGINEERING PHYSICS DEPT., https://guide.wisc.edu/undergraduate/engineering/engineering-physics/engineering-mechanics-bs/ (last visited Apr. 29, 2021).

[14] *Engineering Mechanics, Bachelor of Science*, JOHNS HOPKINS UNIVERSITY WHITING SCHOOL OF ENGINEERING, https://e-catalogue.jhu.edu/engineering/full-time-residential-programs/degree-programs/mechanical-engineering/engineering-mechanics-bachelor-science/ (last visited Apr. 29, 2021).

[15] *BS in Engineering Mechanics*, THE GRAINGER COLLEGE OF ENGINEERING, MECHANICAL SCIENCE & ENGINEERING, https://mechse.illinois.edu/undergraduate/bs-engineering-mechanics (last visited Apr. 29, 2021).

[16] *Accredited Programs*, ABET, https://amspub.abet.org/aps/name-search?searchType=program&keyword=engineering%20mechanics (last visited Apr. 29, 2021) (including the University of Illinois, Wisconsin-Madison, and Johns Hopkins University Engineering Mechanics programs).

B. IPLAC Agrees with Accepting Advanced Degrees Under Category A (Proposal 2)

IPLAC also respectfully agrees that Advanced Degrees, including masters and PhD.s, should be accepted under Category A. In order to receive a master's degree, students receive a solid foundation in their chosen technical area by taking a significant course load within that subject area. For example, the Illinois Institute of Technology requires 32 credit hours in technical subjects before graduating with a master's degree.[17] Thirty-six credit hours of technical courses are similarly required in order to obtain a Master's in Mechanical Engineering from the University of Illinois in Chicago[18] and a master's degree in Biology from the University of California Los Angeles.[19] This extensive course load gives students the ability to understand and convey technical concepts accurately and precisely, which are very important to have in order to competently prosecute patents at the USPTO.

The corresponding PhD programs for the above disciplines sometimes require candidates to obtain a master's degree first.[20] Advanced degrees' extensive work requirements and theoretical underpinnings give students ample opportunity to understand and convey complex technical principles and background to others. As a result, advanced degrees should be accepted under Category A, because they provide the requisite training and background to succeed as a Patent Attorney or Patent Agent.

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[17] *See Computer Science (M.S.)*, ILLINOIS INSTITUTE OF TECHNOLOGY, https://www.iit.edu/academics/programs/computer-science-ms (last visited Apr. 29, 2021).
[18] *Master's Programs, Mechanical and Industrial Engineering*, UIC ENGINEERING, https://mie.uic.edu/graduate/masters-programs/ (last visited Apr. 29, 2021).
[19] *Graduate Program: Biology*, UCLA GRADUATE EDUCATION, https://grad.ucla.edu/programs/life-sciences/ecology-and-evolutionary-biology-department/biology/ (last visited Apr. 29, 2021).
[20] *See* https://www.iit.edu/academics/programs/computer-science-phd ("A four-year bachelor's degree in computer science or a master's degree in computer science is required.").

C. IPLAC Neither Supports Nor Objects to Accepting a Combination of Core Sciences Under Category B, Option 4 (Proposal 3)

IPLAC could not reach consensus on a position with regard to Proposal 3. Comments from some IPLAC members in support of Proposal 3 are outlined below, along with comments from some IPLAC members who disagree with Proposal 3.

1. Comments From Some IPLAC Members in Support of Proposal 3

Some IPLAC members support Proposal 3, because two sequential lab courses may not prepare potential applicants more than taking a single lab course. For example, many universities only require engineering students to take only a single semester of chemistry, and in some cases, zero semesters of chemistry.[21] This can also be the case at prestigious liberal arts colleges. For example, Williams College is the highest-ranked liberal arts college in the nation.[22] However, it does not require Biology majors or Computer Science majors to take any chemistry or physics courses before they graduate. While Biology majors at Williams College are "*strongly advised* to take two semesters of chemistry, a statistics course, calculus and physics,"[23] there is no such language for Computer Science majors.[24] Strongly advising students to take certain courses does not mean those students will actually take those courses in order to graduate.

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[21] *See, e.g.*, *Electrical Engineering Sample Schedule 2019-2020*, ENGINEERING ADVISING CTR., https://advising.engin.umich.edu/coe-majors-requirements/sample-schedules/ (last visited May 20, 2021) (requiring only a single semester of chemistry); *Graduation Requirements*, COMPUTER ENGINEERING, BS, http://catalog.illinois.edu/undergraduate/engineering/computer-engineering-bs/#degreerequirementstext (last visited May 20, 2021) (illustrating that chemistry courses can be taken as a technical elective, and are not required for graduation); *Mechanical Engineering Course Plan (Class of 2025+)*, C. OF ENGINEERING: AEROSPACE AND MECHANICAL ENGINEERING, https://ame.nd.edu/undergraduate/mechanical-engineering-course-plan/ (last visited May 20, 2021) (requiring only a single semester of chemistry).

[22] *Williams College*, U.S. NEWS & WORLD REP., https://www.usnews.com/best-colleges/williams-college-2229/overall-rankings (last visited May 20, 2021).

[23] *The Major*, BIOLOGY, https://biology.williams.edu/the-major/ (last visited May 20, 2021).

[24] *See Major Requirements*, COMPUTER SCI., https://csci.williams.edu/major-requirements/ (last visited May 20, 2021) (requiring students to only take courses in Computer Science and Mathematics and demonstrate proficiency in Discrete Mathematics in order to complete the Computer Science major).

Even though liberal arts colleges like Williams may not require their students to take chemistry or physics to complete certain science majors, they arguably receive scientific training equivalent, if not superior, to their colleagues at large research universities with strict science and engineering curricula. This is because, on a per capita basis, liberal arts colleges "produce twice as many students who earn a PhD in science than other institutions."[25] It cannot be disputed that students who later complete Masters' and PhD programs in science or engineering have received a rigorous and thorough education in scientific principles. However, by requiring students to take either two sequential chemistry or physics courses with labs, the USPTO currently has a narrow view of what constitutes sufficient scientific and technical training. It does not take into the account the rigor of science programs that may be offered at certain liberal arts colleges and universities or the greater chance of success liberal arts college alumni have at earning advanced scientific degrees.

By failing to consider this, the USPTO unintentionally discriminates at least against liberal arts college graduates and students who attend universities that may only require a single semester of chemistry or physics. For these reasons, some IPLAC members at least agree with Proposal 3, which would require applicants to only take a single course with a laboratory component.

2. Comments from Some IPLAC Members Who Disagree with Proposal 3

Some IPLAC members respectfully disagree with broadening the combination of core science courses that could be taken to qualify to sit for the patent bar examination.

[25] *The Colleges Where PhD's Get Their Start*, THE C. SOLUTION, https://www.thecollegesolution.com/the-colleges-where-phds-get-their-start/ (last visited May 20, 2021).

Specifically, some IPLAC members do not agree with decreasing the required number of laboratory credit hours, because hands-on laboratory experience is crucial to developing important skills for a Patent Attorney/Agent. According to the *Handbook of Research on Teaching*, laboratory components in science classes advance five overarching qualities.[26]

First, laboratory work enhances skills, such as manipulation, inquiry, investigation, organization, and communication.[27] Second, students' understanding of concepts are enhanced by labs, including hypotheses, theoretical models and taxonomic categories.[28] Third, the cognitive abilities of students, including problem solving, critical thinking, application, analysis, and synthesis are increased through laboratory instruction.[29] Fourth, labs allow students to understand the nature of science.[30] This nature can include interrelationships between science and technology, relationships between the various scientific disciplines, and even the scientific enterprise itself.[31] Finally, through laboratories, students develop positive attitudes, which can include greater curiosity, objectivity, precision, perseverance, responsibility, and a sense of collaboration.[32] All these skills are important for a Patent Attorney/Agent in communicating with clients and examiners, and in learning about and/or understanding the new inventive technology to be able to provide competent representation of applicants before the USPTO.

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[26] ROBERT MORRIS WILLIAM TRAVERS, SECOND HANDBOOK OF RESEARCH ON TEACHING: NO: 2, (Rand McNally, 1st ed. 1973).
[27] *Id.*
[28] *Id.*
[29] *Id.*
[30] *Id.*
[31] *Id.*
[32] *Id.*

Laboratory work provides a better path to developing an understanding and appreciation for scientific concepts than lecture and independent study. A thorough understanding of scientific concepts is vital to Patent Attorneys/Agents, because it helps them fathom proposed inventions, determine potential infringement scenarios, and evaluate novelty in a particular field. Laboratory work also uniquely hones communication and collaboration skills. It also ingrains the importance of precision and attention to detail in a direct, tangible manner that is not achievable via other learning methods. In order to succeed in a lab, participants who work together in the lab must communicate with each other. They also must convey their findings and results to a wider, and sometimes "non-scientific," audience.

Patent Attorneys/Agents use communication skills in their daily lives by not only obtaining patent protection for their clients' inventions through strategic application drafting, but also guiding their clients through the patent process and advancing their business interests. As a result, patent attorneys must be able to competently relay and convey complex information to others. All of this must be done while having a strict attention to even the smallest of details, which underscores the importance of laboratory work in a Patent Attorney/Agent's day-to-day job.

Most importantly, research has consistently shown that students who engage in well-designed laboratory experiences, such as those provided in undergraduate and graduate settings, develop problem-solving and critical-thinking skills.[33] While classroom instruction can teach *what* to do with scientific principles in the lab, the ability

[33] Patrick Croner, *Developing Critical Thinking Skills Through the Use of Guided Laboratory Activities*, 2(2), THE SCIENCE EDUCATION REVIEW 46:1 (2003).

of a laboratory component to teach *how* or *why* the science works is unparalleled. Understanding the "hows" and "whys" helps Patent Attorneys/Agents draft patent applications broad enough to provide value to the prospective patent holder, but also narrow enough to pass muster in light of the prior art. By actively learning in the lab, students are directly building the skills and confidence needed to succeed as a Patent Attorney/Agent. For these reasons, some IPLAC members believe that the laboratory coursework requirement should remain, in order to continue producing the most qualified and prepared candidates to take the examination for admission to the patent bar.

IPLAC thanks the U.S. Patent and Trademark Office for considering these comments and would welcome any further dialogue or opportunity to support the U.S. Patent and Trademark Office.

Respectfully submitted,

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