



## McKay Orthopaedic Research Laboratory

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The McKay Orthopaedic Research Laboratory of the Department of Orthopaedic Surgery in the Perelman School of Medicine continues to explore important problems in musculoskeletal research. The research facility, including labs and offices, occupies over 22,000 sq. ft. of newly renovated space on the 3<sup>rd</sup> Floor of Stemmler Hall. There are more than 135 full- and part-time staff and trainees now in the labs (an increase of 105% since 2008). McKay is an active, thriving research and educational community committed to advancing basic and translational musculoskeletal research.

The McKay labs have recently completed a transformation both in terms of physical space and faculty. Our home, Stemmler Hall, underwent a >\$120 million renovation, completed in late 2019, which resulted in a fully modernized facility (>110% increase) in which to grow our laboratory space, faculty, and research and training endeavors. Since 2008, our faculty have grown from 7 principal investigators (PIs) to 19, an increase of more than 170%. Working in conjunction with the newly formalized departmental strategic plan, we are excited to continue to support our existing faculty and strategically grow the faculty in the coming years to spur new innovations in musculoskeletal research and education.

With respect to funding, current research expenditures in support of our McKay research programs are >\$15M USD annually, a number that has grown by >172% since 2008, despite flat and/or decreasing NIH pay lines over that time frame. Indeed, **for the first time in more than 30 years, the Department of Orthopaedic Surgery at Penn is ranked #1 in NIH funding** in the nation. While the department has been ranked in the 'top five' of orthopaedic research programs for more than a dozen years, reaching the top position of all programs in the US represents the culmination of years of effort, strategic recruitments, and the hard work of all our faculty, staff, and trainees. Among those contributing to this ranking, Dr. Soslowsky has ranked in the top 5 individually for over a decade, and six of our faculty members are now ranked in the top 50 in the field in terms of NIH funding. Our McKay Lab and research division is 1 of only 2 programs in the nation to be positioned in the top five over this time period, and Dr. Soslowsky is the only investigator to consistently rank in the top five over the last decade.

Notably, a number of our younger and/or newly recruited faculty have been very successful in establishing and growing their research funding base as well. For instance, Drs. Joeng, Heo, Boerckel, Mourkioti, Baxter and Dymont (all Assistant Professors) together have brought in 8 new NIH R01 awards as PI to the Department over the last two years, and the recruitment of Dr. Schipani brought an additional 3 R01s. At the same time, existing faculty have renewed and/or added

many additional NIH R01s, R21s, VA Merit Awards, and other federal funding to further support and grow the research base. Just as importantly, we have continued to support our young faculty towards 'K'-type Awards from the NIH and Career Development Awards from the VA, with two K01s (Baxter, Heo), one CDA-2 (Gullbrand), and one K25 (Hast) over just the last three years. As these new research programs continue to mature, we expect that the Department will continue to rank very highly among all programs nationwide. Finally, our Penn Center of Musculoskeletal Disorders (PCMD), located within the McKay Labs and supported by an NIH P30, was **renewed in 2021 for another five years (years 16-20)**! This Center is the longest running P30 in the nation, and serves as a critical hub for musculoskeletal research at Penn. In addition to the above-mentioned new grants this year awarded to our faculty, each of the McKay Laboratory faculty members remains well-funded through ongoing and newly awarded research grants from federal agencies and industrial sponsors.

Our McKay faculty and trainees also continue to represent the department at major international meetings and via national and international recognitions and high impact publications. For example, Dr. Robert Mauck was awarded the Van C. Mow Medal from the American Society of Mechanical Engineers. Dr. Sarah Gullbrand was awarded the JOR Spine Early Career Award at the 2022 ORS Meeting and Dr. Lachlan Smith was elected President of the ORS Spine Section. Our trainees also won numerous awards and prizes over the last year, including multiple Section Awards and New Investigator Recognition Awards at the 2022 Orthopaedic Research Society Meeting, Young Investigator Awards at the 2021 American Society for Bone and Mineral Research Annual Meeting, and multiple PhD and Masters' Competition selections at the 2021 Summer Bioengineering Conference, to name just a few (for more, please see: <https://www.med.upenn.edu/orl/news/>). Dr. Foteini Mourkioti and Dr. Ling Qin were also recently awarded the prestigious PSOM Dean's Innovation Award, in recognition of their cutting-edge research. Faculty and trainees also regularly publish high profile papers in the leading journals of our field, and these accomplishments are regularly promoted in the lay press.

Growing musculoskeletal research in the Department of Orthopaedic Surgery and across the Penn campus has been a primary objective for our program. Towards this end we have, over the last dozen years, more than doubled in terms of lab faculty, lab personnel, lab space, and research expenditures. Over the last two years, we also initiated two new sub-committees within the McKay Labs. The first is the McKay Diversity, Equity, and Inclusion Committee. This committee (<https://www.med.upenn.edu/orl/mckay-dei-committee>.

html) organizes activities aimed at increasing awareness and engagement of all McKay members to broaden our vision and expand diversity and equity in our research community. This committee has been very active, organizing book clubs, outreach events ('Learning on a Limb'), and conference grants to support, recruit, and retain a diverse trainee population in orthopaedic research. Likewise, our McKay International Outreach Committee (<https://www.med.upenn.edu/orl/international-outreach-committee>) is working to help the McKay Lab present a welcoming face to our international trainees and collaborators, and to promote cultural awareness across McKay and share knowledge with members of the international community joining the group. Finally, to promote and expand our educational mission we hold a monthly internal seminar series, the 'McKay Young Investigator' Seminar, highlighting the outstanding work from our trainees.

This event provides an opportunity for trainees to present their work to the entire group and develop presentation skills. We are so proud of the hard work that McKay members are doing to promote orthopaedic research and build community, here at Penn and across the globe.

The goal of our collective work in McKay remains the same as when the laboratory was founded more than 40 years ago, to carry out the most cutting edge fundamental and translational research in the field of orthopaedics, to train the next generation of scientists and surgeon-scientists, and to improve the health and quality of life of those who suffer from musculoskeletal conditions. With our 40 years of leadership, training, and scientific contributions to musculoskeletal research and building a vibrant and inclusive community of scholars, we are excited for what the future will bring.