

Division of Frontier Engineering	Research field	Nanoscale Measurement Technologies	Lab. ID FE15
Laboratory web site	http://fukuma.w3.kanazawa-u.ac.jp/		
Research subjects			
<p>In our lab., we develop atomic force microscopy (AFM) techniques and apply them to a wide range of academic and industrial research fields. AFM enables atomic-scale imaging of material surfaces by scanning them with an ultrasharp probe. Over the years, we have pioneered numerous world-first AFM technologies, including atomic-resolution imaging in liquid, three-dimensional hydration structure measurements, nanoscale potential mapping in liquid environments, and intracellular AFM measurements in living cells. Building on these technological foundations, we continue to develop advanced nano-measurement techniques that allow us to visualize atomic- and molecular-scale structures and phenomena that have remained inaccessible. We also apply our developed methods to diverse research areas, including life sciences (proteins, cells, diseases), electrochemistry (metal corrosion, catalysis, batteries, sensors), and interfacial chemistry (antifouling, lubrication, dispersion, phase control), contributing to both fundamental science and industrial innovation.</p>			
Master/Doctor course: Education policy, curriculum, typical activity in the laboratory			
<p>We expect students to gain a deep appreciation and understanding of the excitement of research and development through their activities in the laboratory. We also aim for them to acquire strong problem-solving skills—specifically, the ability to remain calm when facing unknown challenges, think logically and systematically about possible solutions, and ultimately resolve the issues they encounter. In our laboratory, students are organized into subgroups of approximately three to five members according to their research topics. We hold individual meetings several times a week, subgroup meetings a few times per month, and a full laboratory meeting once a month. With guidance provided through these meetings, students from different academic years collaborate and take initiative as they engage in their research.</p>			
Daily life in the laboratory, etc.			
<p>As a general rule, we encourage all members to arrive at the laboratory by 9:30 a.m. The time of departure, however, is left to each individual. This policy is intended both to promote a healthy daily routine and to ensure that members share a reasonable amount of overlapping time on campus. In addition to the research meetings described above, we conduct monthly one-on-one interviews (10–30 minutes) with all members to discuss various aspects of laboratory life (faculty).</p> <p>Events such as welcome parties for new students and fishing tournaments are held to promote interaction among laboratory members, making an environment that supports research activities and university life of students. (D1)</p> <p>Our laboratory offers opportunities for international exchange with researchers of diverse nationalities and fields, as well as the possibility of engaging in joint research with companies. Furthermore, with the generous support and guidance provided by professors and technical staff, we can devote ourselves to our research activities with confidence (M1).</p>			
Message or comments by the laboratory faculty staffs			
<p>Students who join our laboratory from other universities for the master's program typically number one every two to three years. After completing the master's degree, an average of one student every one to two years continues on to the doctoral program, although this varies from year to year. Our graduates find employment in a wide range of fields, including electrical engineering, mechanical engineering, chemistry, and analytical instrumentation manufacturers. Because nano-measurement is an interdisciplinary field that encompasses physics, engineering, biology, and chemistry, students are able to choose career paths that match their individual interests. We actively promote industry-academia collaboration and conduct joint research with many companies. As a result, some students who have been involved in collaborative projects during their studies choose to join the partner companies upon graduation.</p>			
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