



# INTRODUCTION TO RESEARCH



# LOGISTICS



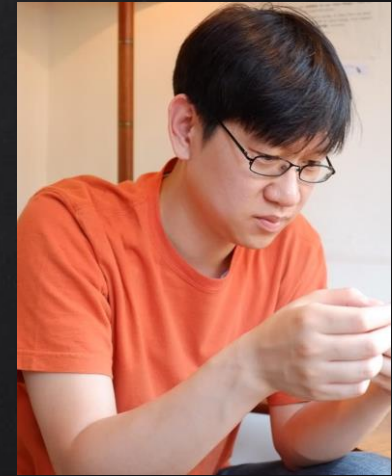
## TEACHING STAFF



Prof. Juho Kim  
Human Computer Interaction  
PhD, MIT 2015  
<https://juhokim.com/>



Prof. Sung-Ju Lee  
Mobile Computing  
PhD, UCLA 2000  
<https://nmsl.kaist.ac.kr/sjlee>



Prof. Shin Yoo  
Software Engineering  
PhD, Kings College London 2009  
<https://coinse.kaist.ac.kr/members/shin.yoo/>



## TEACHING STAFF



Collectively 48 years of research experience  
Passion in mentoring as well as research



# TEACHING ASSISTANT



Joongyum Kim  
PhD Candidate



## CLASS WEBSITES & EMAILS

<http://intro2research.org> : course content & announcements

<http://klms.kaist.ac.kr/course/view.php?id=104419> : grading & assignments upload

[i2r@nmsl.kaist.ac.kr](mailto:i2r@nmsl.kaist.ac.kr) : email to the professors & TA; *please* use this instead of personal emails

2.

WHY RESEARCH?



## WHAT IS RESEARCH?

- X *Oxford*: The systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions
- X *Merriam-Webster*: 1. careful or diligent search; 2. studious inquiry or examination; especially : investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws; 3. the collecting of information about a particular subject





# WHY IS RESEARCH IMPORTANT?

Research creates knowledge

Improves quality of life

Advances society

Brings awareness



# RESEARCH PROCESS

- X Problem identification
- X Solution design
- X Evaluation
- X Communication



## BENEFITS OF DOING RESEARCH

Create knowledge and knowledge is power!

Think and learn

Develop independent, critical thinking skills

Develop communication skills

Understand assertion requires supporting evidence

Job benefits: some positions (e.g., professors) hire only PhDs



Traveling

Defining what you work on

(usually) Flexible work hours (== you work all the time 😊)

Surrounded by smart people

For professors:

X No boss

X Choose collaborators



## CHALLENGES

Pay is decent but not great

(sometimes) Long duration with no tangible output

Lots of smart(er) people working in the same field

Lots of setbacks

Family doesn't understand what you do (e.g., why go to school when no class?)



## QUALITIES OF GOOD RESEARCHERS

- X Curious
- X Resilient to setbacks
- X Thick-skinned
- X Open-minded
- X Courageous
- X Communicative, articulate, good at selling
- X Self motivated, hard working, driven, committed

3.

# ABOUT THIS COURSE



## GOALS OF THIS COURSE

- X Have students “experience” various activities for research
- X Help students make informed decisions on career path
- X Pass on to students what we believe are best practices

We designed the course for undergraduates, but early grad students are welcomed too!





## WHAT THIS COURSE IS NOT

- X Teach students how to do (better) research
- X Encourage students to go to grad school
- X Sway students into certain research areas
- X Cover specific culture of any research area



## COURSE ROADMAP

- X How to choose research area, school, and advisor
- X How to find and read papers
- X How to recognize good research and do good research
- X How to design and analyze results
  - X Basic stats
  - X Human studies
- X What happens to my paper after the submission



## COURSE ROADMAP

- X How to review papers
- X How to present your research
- X What are the research ethics
- X How to market yourself & your research
- X How to write research proposals
- X Life as a researcher



## WORKSHOPS

1. Writing workshop
2. Presentation workshop
3. Paper review workshop
4. Resume workshop



## STUDENT PANELS

1. How I selected my research area and advisor
2. What to do as first-time conference attendees
3. How to survive graduate school



4.

# ASSIGNMENTS & GRADING



# GRADING

Assignments	50%
Participation	20%
Presentation	10%
Project	20%



## PROJECT: WRITE A RESEARCH PROPOSAL

- X Write a proposal on your research idea (individual)
- X Form provided; max 4 pages + references
- X Due May 7<sup>th</sup> (Tue)
- X Each proposal will be reviewed by three classmates
- X Some proposals will be discussed during the mock proposal review panel (May 21<sup>st</sup> & 23<sup>rd</sup>)





## ASSIGNMENT #1: AREA SELECTION

- X Choose a research area for the purpose of this course (you are free to select a different area for your research career!). We provide you with the list of areas and a top conference for each area. You should browse through the recent program of conferences that interest you from the given list
- X Submit a max-500 word essay describing (i) why you chose that area and (ii) the research trend you noticed from the conference
- X Due March 7<sup>th</sup> (Thu) 10am



## ASSIGNMENT #2: PAPER SELECTION

- X From the research area and corresponding conference you selected in Assignment #1, choose a paper that excites you the most
- X Submit (i) a max-500 word essay describing why you chose that paper, why you think it's a good paper, major contributions of the paper, your critique, etc., and (ii) PDF of the paper
- X Due March 19<sup>th</sup> (Tue) 10am



## ASSIGNMENT #3: REWRITING THE ABSTRACT

- X Re-write (not revise) the abstract of the paper you selected in Assignment #2
- X In your submission, include the title and author information of the paper, the original abstract, and your abstract
- X Due March 26<sup>th</sup> (Tue) 10am
- X Some of your writings will be discussed in the writing workshop



## LATEX EXTRA CREDIT

- X For each of the Assignments #1-3, if you write it in LaTeX, you get 10% extra credit!
- X Submit your LaTeX source as well as PDF
- X LaTeX is the de facto standard of research writing preparation system
  - I have not read a good paper not written in LaTeX



## ASSIGNMENT #4: REVIEWING A PAPER

X Write a review of the paper:

G. Laput, W. S. Lasecki, J. Wiese, R. Xiao, J. P. Bigham, and C. Harrison, "Zensors: Adaptive, Rapidly Deployable, Human-Intelligent Sensor Feeds," Proc. of ACM CHI '15.

X Review form provided

X Due April 23<sup>rd</sup> (Tue) 10am

X Some of your reviews will be used in the review workshop



## ASSIGNMENT #5: WRITING A RESUME

- X Write a customized resume for a specific job posting
- X Job postings provided
- X Due May 14<sup>th</sup> (Tue) 10am
- X Selected resumes will be discussed during the resume workshop





## ASSIGNMENT #6: REVIEWING PROPOSALS

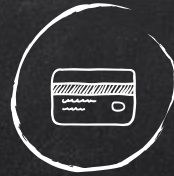
- X Write a review of 3 proposals written by your classmates
- X Review site & form provided
- X Due May 20<sup>th</sup> (Mon) 10am



## ASSIGNMENT #7: ESSAY ON THE COURSE

- X Submit a max-500 word essay describing how your view on research has changed after taking this course, what you liked and disliked, your suggestion for the future course, etc
- X Due June 4<sup>th</sup> (Tue) 10am





## PRESENTATION

- X Present the paper you selected in Assignment #2
- X Five minutes each
- X April 9<sup>th</sup> (Tue) and 11<sup>th</sup> (Thu)





## PARTICIPATION

- X Participation is essential in effective learning in any class, but especially in this course
- X You can participate in many ways:
  - In class Q&A, discussion
  - Online discussion, Q&A
  - Workshop volunteering
  - Questions to student panelist (pre- & live)
  - Mock research review panel



## COURSE POLICY

- X No plagiarism
- X No late submissions
- X English
- X No auditing
- X Registration



## COURSE REGISTRATION

- X The space is limited because we want to provide high-quality feedback to each student
- X We believe this course would be most beneficial for students with no or very little research experience
- X If you are a 2<sup>nd</sup> year MS or PhD student, please see us after class

5.

# STUDENT FEEDBACK



- X Everything is well-prepared, including lectures and course webpage. Online course materials are updated on time
- X The course is designed really well, it involves students into discussions, which leads to better understanding.
- X I like the topics that were covered in the course, since they represent important parts of the research process
- X I appreciate that professors are open to questions, take them seriously and try to give the best answer they can.
- X I like the assignments that are given during the course. They help to practice useful skills.



- X I think it's great to have three professors from different CS subfields in the class. Together they can give a more broad picture of the research field than one professor could give.
- X I really appreciate professors' will and hard work on creating this course. The course helps me to settle the various facts I heard about and build a consistent picture. This, in turn, gives me confidence in myself and my research work.
- X As an undergraduate, I only had very general thoughts about research. After this course, I could catch a glimpse of what research is, which would definitely affect my career path.



- X I loved the course because the course does not try to give me some academic knowledge; rather, I could learn some experience of professors and panels. I think it is impossible in any other courses in KAIST.
- X Comments from professors about assignments and presentations helped a lot how to fix my things to be better.
- X This course fulfilled my needs that I expected it to fulfill: to connect various pieces of information about research as a profession that I had into a more-or-less whole picture.





- X The doubts and misconceptions of doing research have been resolved.
- X I am usually very scared to talk to professors. And this was one of my big worries when considering graduate school because I couldn't imagine myself working with them. Fortunately, professors for this i2r course were very friendly and approachable. Also, after hearing a lot about their personal experiences and the steps they have built up, I felt less distant from them.



- X The lectures and assignment deadlines were planned ahead and didn't move back and forth throughout the course.
- X The course delivered what it promised in the description
- X Really-really-really high quality of the lectures: content, speech, slides, little jokes, interaction with the audience, handling questions: I was learning not only from what the professors were talking about but also from how they were doing it.
- X Assignments were relevant and interesting to do (love that professors allowed to chose the paper for abstract assignment and presentations from a wide variety of topics.)



- X Assignments received individual feedback
- X It was allowed to improve the HW after workshops – with this I could feel my progress with learning from mistakes of others and myself.
- X High quality feedback on the presentation. Seriously, I don't know how professors managed to carefully listen and evaluate everyone. I tried to do that on the 5-min talk day when I wasn't presenting, but it was quite hard to keep up with the pace and not to lose the attention ^^



X Professors showed a good example of the teamwork: the lectures of different professors were smooth and connected, it was clear that they share the goals and the vision, and at the same time provide the different views from different fields, and experiences; the additional comments during the lectures were relevant; the communication with students was organized in a way that there is no need of redirecting the students to the "other professor, that will give a lecture next week" (thanks to the shared mailbox and the fact that all professors knew what's going on in the course and participated in almost all the lectures).



X I'm leaving with an impression that the professors cared a lot about this course and managed to make it with a very high quality: something I wished to be but didn't really expect since it's the first run of the course. With all my heart, I wish the course to keep going, become even better, and spread awareness among the student about the research even further. Yay!



- X 그야말로 끝이 떨어지는 강의 준비가 아닐 수가 없습니다. 그저 수업을 가는 것만으로도 시야가 넓어지는 것을 느낍니다.
- X 매 강의마다 매우 신경 쓰셔서 슬라이드를 준비해주십니다. 슬라이드 내용도 굉장히 알차고 도움이 많이 됩니다.
- X 편향되지 않고, 교수님들끼리 토론을 하시면서 일방적인 수업이 아닌, 토론식 수업이 자연스럽게 되는 것 같습니다. 학생들에게 질문할 기회도 많이 주시고, 수업 참여를 유도하는 장치가 많아 전혀 지루하지 않습니다.
- X 수많은 질문에 대해서 교수님들이 직접 자신의 주관을 말해주는 것이 너무 좋습니다



- X 전산학부 전필이 되어야 함. 전산학부 전필을 넘어서 모든 학과에서 이런 형식의 수업을 해야 한다고 생각함. 특히 아무 생각없이 대학원 가는 사람들을 위해서
- X 너무나도 좋고 유용하고 실질적으로 도움이 되는 뜻깊은 수업이었습니다
- X 제가 연구에 맞는지, 안 맞는지를 생각하고 어느정도 확인할 수 있었던 좋은 시간이었습니다. 특히 **student panel**이나, **CV**를 써보는 것 등의 활동이 매우 유익했던 것 같습니다.
- X 수업 준비에 많은 시간이 들었을 것 같은데, 좋은 수업 정말 감사합니다.



- X 완벽한 강의였습니다
- X 한 과목이라고 하기에는 굉장히 많은 내용을 담고 있어서 크게 도움이 되었습니다.
- X 자기주도적으로 학습하도록 장려하는 점이 한편으로는 버겁기도 하였지만 돌아보면 배운것이 정말 많았습니다. 감사합니다.
- X 논문과 연구에 대해서 막연한 공포감과 벽을 가지고 있었습니다. 하지만 수업을 통해서 자연스럽게 이런 활동을 접하고 연구라는 것이 어째서, 어떻게 재미있을 수 있는지 공감했습니다.





X 2년 전 쯤, 대학원에 오지 말라는 무수한 선배들의 조언만 주며 연구가 무엇인지 아무도 알려주지 않았고, 물어봐도 너무 추상적인 대답을 들었을 때가 있었습니다. 그런 연구에 대해서 교수님들의 솔직하고 진솔한 대답들로 몇몇 친구들은 최소한 '연구'에 대한 그림이 잡혔을 것이라고 생각합니다. 제 개인적으로는 올해에 직접 연구실에서 연구를 하다 보니 교수님들의 바쁨을 알아버렸고, 교수님들의 시간을 연구외의 제 개인적인 고민, 궁금증에 대해 질문하는 것이 조금 힘들어졌는데, 수업시간을 활용해서 멋진 교수님들께 질문을 할 수 있다는 것이 매우 도움이 많이 되었습니다. 특히 교수님들의 경험에서 우러난 조언으로 학생들의 입장으로 헤아려주면서 이해하고 소통해주셔서 감사합니다.



- X 대학원생, 그리고 교수의 구체적인 삶과 하는 일에 대해 간접적으로 체험해 볼 수 있는 매우 좋은 기회였습니다. 그리고, 생각보다 제가 몰랐던 부분이 많이 있었습니다.
- X 이전에는 정확히 대학원에서 어떤 일을 하는지 지금처럼 구체적으로 알지 못했고, 주위의 대학원생 선배들이 힘들다고 하는 것 밖에 듣지 못하여 대학원의 두려움 때문에 선뜻 대학원을 가야겠다는 생각이 들지 않았는데, 막상 대학원에서 무엇을 하는 지를 듣고 어떤 점이 힘들 것인지를 듣고 가니 그러한 것들의 무서움이 사라져서 오히려 대학원에 지원할 용기가 나는 것 같습니다. 정리하자면, 대학원의 좋은 점과 안좋은 점을 가감 없이 듣게 되니 대학원 생활 때 힘든 일이 닥쳐도 당황하지 않고 잘 극복할 수 있을 것 같은 용기가 나게 되었습니다.



- X 단순히 취업이 싫어서, 그냥 졸업하고 뭘 할 지 몰라서, 그냥 너무 당연하게 대학원에 가야 할 것 같아서 대학원에 진학하는 것이 아니라, 연구를 함으로써 내 삶이 어떤 방향으로 흘러갈 수 있는지, 이 일을 계속하고 싶다면 어떤 분야를 하고 싶은지, 그러기 위해서 내가 무엇을 노력해야 하는지, 내가 무엇을 할 수 있는지에 대하여 진지하게 고민해볼 수 있었습니다.
- X 이런 수업을 들을 수 있어서 카이스트 학생이라는게 너무 좋았어.
- X 연구에 대해서 배우러 왔는데, 인생을 배우고 간다.



## RECOMMENDATION

- X You will get the most out of this course if you passionately perform the activities and discuss your experiences in class
  
- X Truly an interactive class
  - X You won't make any mathematical proof or write any code
  - X No need to take notes
  
- X If you enjoy the activities and discussion, you might have a career in research



PLEASE PARTICIPATE IN THE SURVEY

[http://bit.ly/i2r\\_survey](http://bit.ly/i2r_survey)