Youngjun Kim, Ph.D.

5, Hwarangno 14-gil, Seongbuk-Gu, Seoul 02792, Republic of Korea

+82-2-958-5606 (office), +82-10-5234-5378 (mobile)

junekim@kist.re.kr

EDUCATION

Postdoctoral Scholar, Radiation Oncology, Stanford University, USA **(May. 13 ~ Apr. 14)**

- Deformable surface registration for patient setup in radiotherapy (Advisor: Lei Xing)

Ph.D., Mechanical & Aerospace Engineering, **Seoul National University, Korea** **(Mar. 05 ~ Aug. 09)**

- 3D postoperative analysis of total knee arthroplasty using 2D-3D medical image registration (Advisor: Prof. Kunwoo Lee)

M.S., Mechanical & Aerospace Engineering, Seoul National University, Korea **(Mar. 01 ~ Feb. 03)**

B.S., Mechanical & Aerospace Engineering, Seoul National University, Korea **(Mar. 97 ~ Feb. 01)**

RELEVANT PROFESSIONAL EXPERIENCE

Korea Institute of Science and Technology, Seoul, Korea

Senior Researcher at Center for Bionics **(Sep. 11 ~ present)**

Adjunct Professor at University of Science and Technology **(Mar. 12 ~ present)**

Star Postdoctoral Researcher at Intelligence and Interaction Center **(Oct. 09 ~ Aug. 11)**

K&I Technology Co., Ltd, Seoul, Korea **(Mar. 03 ~ Aug. 09)**

Manager at K&I Research Center

- 3D laser scanners and CAD/CAM applications for human body, Computer vision inspection system, Micro CT inspection software
  Technical environment: C++, MFC, OpenGL, OpenCV, VTK, ITK, CUDA, etc.

PROFESSIONAL MEMBERSHIPS

Board Committee Member, **Korean Society for Computer Design and Engineering (Jan. 16 ~ present)**

Board Committee Member, **Korean Society of Imaging Informatics in Medicine** **(Jan. 16 ~ present)**

Board Committee Member, **Korean Society for Simulation Surgery** **(Jan. 15 ~ present)**

PUBLICATION

Journal Article (Reviewed)

1. **Youngjun Kim**, Yong Hum Na, Lei Xing, Rena Lee, Sehyung Park, "Automatic deformable surface registration for medical applications by radial basis function-based robust point-matching", *Computers in Biology and Medicine*, (Accepted)
2. **Youngjun Kim**, Quoc Cuong Nguyen, Sehyung Park, HyukDong Kwon, "End-effector path planning and collision avoidance for robot-assisted surgical system", *International Journal of Precision Engineering and Manufacturing*, (Accepted)

3. Quoc Cuong Nguyen, **Youngjun Kim**, HyukDong Kwon, "Optimization of layout and path planning of surgical robotic system", *International Journal of Control, Automation and Systems*, DOI: 10.1007/s12555-015-0418-z, (Accepted)
4. Chang Kyu Lee, **Youngjun Kim**, Nam Lee, Byungwoo Kim, Do Young Kim, Seong Yi, "Feasibility study of utilization of action camera, GoPro Hero 4, Google glass and Panasonic HX-A100 in Spine surgery", *Spine*, DOI: 10.1097/BRS.0000000000001719, Jun. 2016 (Epub ahead of print)
5. **Youngjun Kim**, Wontae Kim, Deukhee Lee, "3D Inspection by Registration of CT and Dual X-ray Images", *Journal of International Society for Simulation Surgery*, Vol. 3, No. 1, pp. 16-21, Jun. 2016
6. Jong Pil Yoon, Seok Won Chung, Ju-Eun Kim, Hyung Sup Kim, Hyun-Joo Lee, Won-Ju Jeong, Kyung-Soo Oh, Dong-Oh Lee, Anna Seo, **Youngjun Kim**, "Intra-articular injection, subacromial injection, and hydrodilatation for primary frozen shoulder: a randomized clinical trial", *Journal of Shoulder and Elbow Surgery*, Vol. 25, No. 3, pp. 376-383, Mar. 2016
7. **Youngjun Kim**, Laehyun Kim, Deukhee Lee, Sangkyun Shin, Hyunchul Cho, Frederick Roy, Sehyung Park, "Deformable mesh simulation for virtual laparoscopic cholecystectomy training", *Visual Computer*, Vol. 31, No. 4, pp. 485-495, Apr. 2015
8. **Youngjun Kim**, Ruijiang Li , Yong Hum Na , Lei Xing, Rena Lee, "Accuracy of surface registration compared to conventional volumetric registration in patient positioning for head-and-neck radiotherapy: a simulation study using patient data", *Medical Physics*, Vol. 41, No. 12, Dec. 2014
9. Sangkyun Shin, **Youngjun Kim**, Hyunchul Cho, Deukhee Lee, Sehyung Park, Laehyun Kim, Gerard Kim, "A single camera tracking system for 3D position, grasper angle, and rolling angle of laparoscopic instruments", *International Journal of Precision Engineering and Manufacturing*, Vol. 15, No. 10, pp. 2155-2160, Oct. 2014
10. **Youngjun Kim,** DongJune Chang, Jungsik Kim, Sehyung Park, "Gallbladder removal simulation for laparoscopic surgery training: a hybrid modeling method", *Journal of Computer Science Technology*, Vol. 28, No. 3, pp. 499-507, 2013
11. **Youngjun Kim,** Wontae Kim, Sehyung Park, Jong-Hyeong Kim, "Calibration method for micro-scale dual X-ray imaging system", *International Journal of Precision Engineering and Manufacturing*, Vol. 13, No. 6, pp. 877-882, 2012
12. **Youngjun Kim**, Seungbin Lee, Frederick Roy, Deukhee Lee, Laehyun Kim, Sehyung Park, "Carving Mesh with Deformation for Soft Tissue Removal Simulation", *Mesh Processing in Medical Image Analysis, Lecture Notes in Computer Science*, Vol. 7599, pp. 70-79, 2012
13. **Youngjun Kim**, Kang-Il Kim, Jin Hyeok Choi, Kunwoo Lee, "Novel methods for 3D postoperative analysis of total knee arthroplasty using 2D–3D image registration", *Clinical Biomechanics*, Vol. 26, No. 4, pp. 384-391, 2011
14. Daekwang Myung, **Youngjun Kim**, Jin hyeok Choi, Kunwoo Lee, "Scaled attenuation fields: improved real-time generation method for digitally reconstructed radiographs", *International Journal of Precision Engineering and Manufacturing*, Vol. 11, No. 5, pp. 791-798, 2010
15. **Youngjun Kim**, Kunwoo Lee, Wontae Kim, "3D virtual simulator for breast plastic surgery", *Computer Animation and Virtual Worlds*, Vol. 19, Issue 3-4, pp. 515-526, 2008
16. **Youngjun Kim**, Jungbum Cho, Bohyun Kim, Kunwoo Lee, "Modeling of human head for custom wig production", *Lecture Notes in Computer Science*, Vol. 4561, pp. 874-883, Springer Berlin, 2007

International Conference Paper (Reviewed)

1. **Youngjun Kim**, Sunhee Kim, Hannah Kim, Hyunchul Cho, Deukhee Lee, Laehyun Kim, Sehyung Park, Jung-Woo Lee, "Automatic segmentation and user-friendly software techniques for virtual surgical planning of mandibular reconstruction", *IEEE Engineering in Medicine and Biology Society*,

Orlando, USA, Aug., 2016

2. Si-Myung Park, Deukhee Lee, **Youngjun Kim**, Jung-Woo Lee, Gunwoo Noh, "Stability of the permanently bent plates used in mandibular reconstruction surgery", *IEEE Engineering in Medicine and Biology Society*, Orlando, USA, Aug., 2016
3. Siyeop Yoon, Sangkyun Shin, Hyunchul Cho, **Youngjun Kim**, Deukhee Lee, Laehyun Kim, Gunwoo Noh, "Enhanced markerless surgical robotic optimal guidance system for keyhole neurosurgery", *IEEE Engineering in Medicine and Biology Society*, Orlando, USA, Aug., 2016
4. Nigusse Kinde Mekuria, **Youngjun Kim**, Hyunchul Cho, Deukhee Lee, Sehyung Park, Byung Hoon Lee, Ki-Mo Jang, Joon Ho Wang, "The Effect of Optical Marker Configuration on Tracking Accuracy in Image Guided Surgery", *Medicine Meets Virtual Reality 22*, Los Angeles, USA, Apr., 2016
5. **Youngjun Kim**, Sunhee Kim, Hannah Kim, Hyunchul Cho, Deukhee Lee, Laehyun Kim, Sehyung Park, Jung-Woo Lee, "Virtual Surgery Planning and Surgical Guide Design using Automatic Active Contour Segmentation for Maxillofacial Reconstruction Surgery", *International BioMedical Engineering Conference*, Kyungju, Korea, Nov. 2015
6. Sunhee Kim, **Youngjun Kim**, Deukhee Lee, and Sehyung Park, "Active Contour Segmentation Using Level Set Function with Enhanced Image from Prior Intensity", *IEEE Engineering in Medicine and Biology Society*, Milan, Italy, Aug., 2015
7. Sangkyun Shin, Hyunchul Cho, Siyeop Yoon, Kyusic Park, **Youngjun Kim**, Sehyung Park, Laehyun Kim, Deukhee Lee, "Markerless Surgical Robotic System for Intracerebral Hemorrhage Surgery", *IEEE Engineering in Medicine and Biology Society*, Milan, Italy, Aug., 2015
8. Anna Seo, Sunhee Kim, **Youngjun Kim**, Laehyun Kim, Sehyung Park, Suk Won Jung, "Three-Dimensional Visualization for Surgical Planning of Rotator Cuff Tears", *The Asian Conference on Computer Aided Surgery 2015*, Singapore, Jul., 2015
9. **Youngjun Kim**, Hyunchul Cho, Kinde Mekuria, Deukhee Lee, Sehyung Park, Byung Hoon Lee, Dong Ho Kum, Joon Ho Wang, "Development of a surgical navigation system for Development of a surgical navigation system for anterior cruciate ligament reconstruction", *International Journal of Computer Assisted radiology and Surgery 2015*, Barcelona, Spain, Jun., 2015
10. Quoc Cuong Nguyen, **Youngjun Kim**, HyukDong Kwon, "Optimal placement of medical robotic system using genetic algorithms", *The 1st International Joint Conference on Convergence*, Ho Chi Minh, Vietnam, Feb., 2015
11. Kinde Mekuria, **Youngjun Kim**, Hyunchul Cho, Deukhee Lee, Sehyung Park, Eunsu Lee, Byung Hun Lee, Joon Ho Wang, "Surgical navigation system for anterior cruciate ligament reconstruction", *International Biomedical Engineering Conference 2014*, Gwangju, Korea, Nov., 2014
12. Quoc Cuong Nguyen, **Youngjun Kim**, Sehyung Park, HyukDong Kwon, "Layout optimization of medical robotic system in the operating room", *International Biomedical Engineering Conference 2014*, Gwangju, Korea, Nov., 2014
13. **Youngjun Kim**, Ruijiang Li, Yong Hum Na, Cesare Jenkins, Rena Lee, Lei Xing, "Is surface registration accurate enough for patient setup in head-and-neck radiation therapy?", *American Society of Radiation Therapy's 56th Annual Meeting*, San Francisco, USA, Sep., 2014
14. Yong Hum Na, Daniel Kapp, **Youngjun Kim**, Tae-Suk Suh, Lei Xing, "VMAT Treatment Planning Using Cloud Computing", *American Society of Radiation Therapy's 56th Annual Meeting*, San Francisco, USA, Sep., 2014
15. Sunhee Kim, **Youngjun Kim**, Sehyung Park, Deukhee Lee, "Automatic Segmentation of Leg Bones by Using Active Contours", *IEEE Engineering in Medicine and Biology Society*, Chicago, USA, Aug., 2014
16. Sehyung Park, Young Il Yoon, Frederick Roy, **Youngjun Kim**, "Development of Simulator for Basic Core Training for Arthroscopic Shoulder Surgery", *International Journal of Computer Assisted*

radiology and Surgery 2014, Vol. 9, Issue 1, Fukuoka, Japan, Jun., 2014

17. Sung-Hwan Lim, Jin hyeok Choi, **Youngjun Kim**, Deukhee Lee, Sehyung Park, Joon Ho Wang, "Robotic guide system for reducing human alignment error in computer-assisted anterior cruciate ligament reconstruction", *International Journal of Computer Assisted radiology and Surgery 2014*, Vol. 9, Issue 1, Fukuoka, Japan, Jun., 2014
18. Jin hyeok Choi, Seung-Yeob Baek, Tae-geun Son, **Youngjun Kim**, Kunwoo Lee, "Automatic Detection of Inferior Alveolar Nerve Canal from Cone Beam Computed Tomography for Dental Surgery Planning", *Medicine Meets Virtual Reality 21*, Los Angeles, USA, Feb., 2014
19. Jin hyeok Choi, **Youngjun Kim**, Sung-Hwan Lim, Deukhee Lee, Sehyung Park, Shinhyung Par, Joon Ho Wang, "3D Preoperative Surgical Planning Software for Anterior Cruciate Ligament Reconstruction", *13th International Conference on Control, Automation and Systems*, Gwangju, Korea, Oct. 2013
20. Jin hyeok Choi, **Youngjun Kim**, Tae-kyoung Yi, Jekyo Jung, Yong Kim, Sehyung Park, "Optimized Marker for Template-Guided Intraoral Surgery", *Medicine Meets Virtual Reality 20*, San Diego, California, USA, Feb., 2013
21. Jin hyeok Choi, **Youngjun Kim**, Sehyung Park, "3D Preoperative Planning of Intracerebral Hemorrhage (ICH) Removal Robotic Surgery", *Asian Conference on Design and Digital Engineering*, Hokkaido, Japan, Dec., 2012
22. Sangkyun Shin, Deukhee Lee, **Youngjun Kim**, Sehyung Park, "Markerless Registration for Intracerebral Hemorrhage Surgical System using Weighted Iterative Closest Point (ICP)", *34th Int'l Conference of the IEEE Engineering in Medicine & Biology Society*, San Diego, USA, Aug. 2012
23. **Youngjun Kim**, Tae-kyung Lee, Jin hyeok Choi, Yong Kim, Je-kyo Jung, Park Ji-Man, Sehyung Park, "New registration method for customized dental implant guiding system", *Computer Assisted Radiology and Surgery 2012*, Pisa, Italy, 27-30 Jun., 2012
24. **Youngjun Kim**, Kyung Hwan Kim, Frederick Roy, Sehyung Park, "Development of laparoscopic surgical training system with simulation open source framework architecture (SOFA)", *The Asian Conference on Computer Aided Surgery 2011*, Bangkok, Thailand, 26-27 Aug., 2011
25. Nova Eka Diana, **Youngjun Kim**, Deukhee Lee, Sehyung Park, "Development of a Cost-Effective Haptic System for Laparoscopic Surgery Simulation", *2011 Asian Conference on Design and Digital Engineering*, Shanghai, China, 27-29 Aug., 2011
26. Sangkyun Shin, **Youngjun Kim**, Hyunsoo Kwak, Deukhee Lee, Sehyung Park, "3-D tracking of surgical instruments using a single camera for laparoscopic surgery simulation", *Medicine Meets Virtual Reality 18*, Newport Beach, California, USA, 8-12 Feb., 2011
27. **Youngjun Kim**, Jungsik Kim, Jaesoon Choi, DongJune Chang, Sehyung Park, "Laparoscopic surgery simulation system using boundary element method", *The Asian Conference on Computer Aided Surgery 2010*, Busan, Korea, 26-27 Nov., 2010
28. **Youngjun Kim**, Sang Ok Koo, Deukhee Lee, Laehyun Kim, Sehyung Park, "Mesh-to-mesh collision detection by ray tracing for medical simulation with deformable bodies", *Cyberworlds 2010*, Singapore, 20-22 Oct., 2010
29. Limlim Li, **Youngjun Kim**, Yanzhao Ma, Kang-Il Kim, Kunwoo Lee, "Postoperative analysis of the biomechanical effect of TKA using the finite element method", *CMBBE2010*, Valencia, Spain, 24-27 Feb., 2010
30. Deukhee Lee, **Youngjun Kim**, Laehyun Kim, Sehyung Park, "Hybrid simulator for laparoscopic surgery", Gwangju, Korea, *2009 ICIMT*, 2-5 Dec., 2009
31. **Youngjun Kim**, Wontae Kim, Jin hyeok Choi, Tae-geun Son, Seungbin Lee, Kunwoo Lee. "Volume data inspection tools for industrial computed tomography", *WORLDCOMP'09*, Las Vegas, USA, 13-16 Jul., 2009

32. **Youngjun Kim**, Kunwoo Lee, Wontae Kim. "Image-based 3D torso body modeling", *GRAPP 2008*, Madeira, Portugal, 22-25 Jan., 2008

AWARD

1. Best Paper Award, "Optimal placement of medical robotic system using genetic algorithms", The 1st International Joint Conference on Convergence, Feb. 2015
2. Student Paper Award (Student: Kinde Mekuria, PI: Youngjun Kim), "Surgical navigation system for anterior cruciate ligament reconstruction", International Biomedical Engineering Conference 2014, Nov. 2014
3. Young Scientist Award, The 2013 Korea CAD/CAM Conference, Jan. 2013
4. Best Paper Award, "Development of cholecystectomy simulation for laparoscopic surgery training", The 2012 Korea CAD/CAM Conference, Feb. 2012
5. Encouragement Prize, The 18th Software Contest of Korea, sponsored by Ministry of Communication and Information, 2006
6. Grand Prize, The 5th CAD/CAM Software Contest of Korea, sponsored by Ministry of Communication and Information, 2002
7. Seoul National University Academic Scholarship, 1998-2000

INTELLECTUAL PROPERTY

Patent

1. Sehyung Park, Laehyun Kim, Deukhee Lee, Hyunchul Cho, **Youngjun Kim**, "Carving simulation and device for deformable model", Republic of Korea, 2014 (1401417)
2. **Youngjun Kim**, Kunwoo Lee, Tae Ho Chang, Kang-Il Kim, "Patient-specific registration guiding system and the method", Republic of Korea, 2014 (1362252)
3. **Youngjun Kim,** Sangkyun Shin, Sehyung Park, Deukhee Lee, Laehyun Kim, "3 dimension tracking system for surgery simulation and localization sensing method", United States of America, 2014 (8,682,062)
4. **Youngjun Kim**, Hakyoung Lee, "Method of detecting a defect in an object and apparatus for performing the same", Republic of Korea, 2010 (10-2011-0002740)
5. Taekyung Lee, Chulwoo Park, **Youngjun Kim**, "Method for three dimensional reconstruction by two dimensional detection of multi projected light with predetermined magnification angle", Republic of Korea, 2010 (10-2011-0037084)
6. **Youngjun Kim**, Kang-Il Kim, Hak-Young Lee, "Method of calibrating a dual X-ray imaging system and Method of obtaining a three-dimensional position of a postoperative articulation using the calibrating method", Republic of Korea, 2009 (10-1107513)

Patent Pending

1. **Youngjun Kim**, Sehyung Park, Hyunchul Cho, "Image guided surgery system for accurate tunneling in anterior cruciate ligament reconstruction", Republic of Korea, 2015-0147317
2. **Youngjun Kim**, Hyunchul Cho, Laehyun Kim, Deukhee Lee, Sehyung Park, Hannah Kim, Jung-Woo Lee, "Method for Generating Surgery Planning in Mandible Reconstruction Surgery Using Fibula, Surgery Planning Generation Server Performing The Same, And Storage Medium Storing The Same", Republic of Korea, 2015-0147318

3. **Youngjun Kim**, Sehyung Park, Gunwoo Noh, Seok Won Chung, "Method for 3D automatic modeling of shoulder rotator cuff ", Republic of Korea, 2015-0147784
4. Sehyung Park, Deukhee Lee, **Youngjun Kim**, Hyunchul Cho, Joon Ho Wang, "Surgical navigation system for anterior cruciate ligament reconstruction", Republic of Korea, 2015-0032626
5. Sunhee Kim, **Youngjun Kim**, Laehyun Kim, Deukhee Lee, Sehyung Park, "Method for reconstruction of 3D maxillofacial model by medical image segmentation", Republic of Korea, 2015-0132843

TECHNOLOGY TRANSFER

1. 3D simulation and analysis software for orthognathic surgery, Orapix Inc., ₩150,000,000 ($150,000), 2016
2. Virtual training simulation software for laparoscopic surgery, Cubictek Inc., ₩25,000,000 ($25,000), 2011

Updated on Jul. 27, 2016

3 차원 의료영상 소프트웨어 기술 및 응용

김영준

한국과학기술연구원 바이오닉스연구단

최근, 수술 전 가상 수술 계획 수립, 영상 유도 수술, 로봇 수술 등, 수술 결과 및 환자의 안전을 제고하기 위하여 많은 노력이 시도되고 있다. 이러한 새로운 수술 기법들을 위하여서는 3 차원 의료영상 소프트웨어 기술이 필수적이다. 본 강연은 3 차원 의료영상 소프트웨어에 관한 최신 연구동향을 다룬다. 강연의 주된 주제는 3 차원 수술 전 계획 수립, 환자 영상 모델링, 의료영상정합, 수술 내비게이션, 3 차원 수술 후 분석, 가상 수술 시뮬레이션 등이며, 3 차원 기반 뇌수술 및 정형외과 수술을 포함한 다양한 응용 사례를 소개할 예정이다. 또한, 복강경/관절경 수술 훈련을 위한 가상 훈련 시뮬레이션 기술 개발 사례를 소개할 것이다. 강연의 마지막에서는 현재 진행중인 악안면 재건수술을 위한 3 차원 가상 수술 계획 및 수술 가이드 설계 기술에 대해 소개하고자 한다.

3D medical software techniques and the applications

Youngjun Kim

Center for Bionics, Korea Institute of Science and Technology

To enhance the surgical outcome and patient safety, many new technologies are being applied to surgeries such as virtual surgical planning, image guided surgery, and robotic surgery. For these new surgical technologies, 3-dimensional medical image software techniques are essential. In this talk, I will introduce the state-of-art 3D medical image software techniques. Main topics of the talk include 3D pre-operative planning, segmentation, registration, surgical navigation, 3D post-operative analysis, and virtual training simulation. Various applications using the 3D medical image software techniques will be presented including 3D-based brain and orthopedic surgical systems. I will also introduce how I developed virtual training simulation techniques for laparoscopic/arthroscopic surgical training. At the end of the talk, ongoing project of my research team will be introduced: 3D virtual surgical planning and surgical guide design for maxillofacial reconstruction surgery.