BIOGRAPHICAL SKETCH

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NAME: Kusnoto, Budi

eRA COMMONS USER NAME (credential, e.g., agency login): BKUSNO1

POSITION TITLE: Professor of Orthodontics, Program and Clinic Director

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
University of Indonesia	DDS	2/1994	Dentistry
Computer Science Institute, Indonesia	BSc	5/1993	Comp Sc Eng
The University of Illinois at Chicago	MS	5/1998	Oral Sciences
The University of Illinois at Chicago	Cert Ort	5/1998	Orthodontics
The University of Illinois at Chicago	Fellowship	5/1999	Craniofacial
The University of Illinois at Chicago	DDS	5/2004	Dentistry

A. Personal Statement

I obtained his master's degree in oral sciences and specialty certificate in orthodontics in 1998 from University of Illinois at Chicago and did my fellowship in the University of Illinois at Chicago (UIC) Craniofacial Center in 1999. I have been involved in the implementation of digital technology in the Department of Orthodontics at the UIC. I am currently a tenured Professor of orthodontics, Program and Clinical Director. I am also coordinator of the digital imaging laboratory in the Department of Orthodontics, University of Illinois at Chicago (UIC). My degree in computer science as well as in the field of dentistry/orthodontics make my contribution significant to this project. My knowledge in growth and development of the human craniofacial complex is complementary to my teaching in the field of orthodontic diagnosis and treatment planning. I am also actively involved in research and teaching on the subject of diagnosis and treatment planning particularly in using Bioprogressive principles. Much of my work has been published in refereed journals and was recognized as amongst the top 10 as most cited research in the past 20 years (Fernandes EC, Junior M, Torres A, Nobrega F, Santos P. The 100 most-cited articles in orthodontic journals in the last 20 years. Am J Orthod Dentofac Orthop. (2021) (https://doi.org/10.1016/j.ajodo.2021.08.016) I am also actively involved in research involving management of craniofacial patients and orthognathic surgical cases as well as teaching on the subject of diagnosis and treatment planning utilizing 3D imaging technology, teledentistry and development of artificial intelligence and machine learning implementation in orthodontics as well as continuous endeavor in the Shape Memory Polymer research. I am also an active member in good standing of American Association of Orthodontists, Illinois Society of Orthodontist, Midwest Society of Orthodontist, Chicago Dental Society and American Dental Association.

B. Positions and Honors

Positions and Employment

1999-2001	Clinical Assistant Professor, Department of Orthodontics, Trisakti University, Jakarta, Indonesia.
1999-2001	Faculty Member, Department of Orthodontics, University of Illinois Chicago, Chicago, Illinois.
2001-2004	Clinical Assistant Professor, Department of Orthodontics, University of Illinois Chicago, Chicago, Illinois.
2003-2009	Practitioner, Faculty Dental Practitioner, Orthodontics, UIC College of Dentistry, University of Illinois Chicago, Chicago, IL
2004-present	Clinic Director, Orthodontics, UIC College of Dentistry, University of Illinois Chicago, Chicago, IL
2005-2009	Assistant Professor, Department of Orthodontics, University of Illinois Chicago, Chicago, IL
2009-2017	Associate Tenured Professor, Department of Orthodontics, University of Illinois Chicago, Chicago, IL
2017-2018	Interim Chair and Program Director, Department of Orthodontics, University of Illinois Chicago
2017-Current	Tenured Full Professor, Department of Orthodontics, University of Illinois Chicago, Chicago, IL
2018-Current	Program Director, Department of Orthodontics, University of Illinois Chicago, Chicago, IL

Selection of other professional activities, and experiences

1999- Present	Active member American Association of Orthodontists
1999- Present	Active member American Dental Association
1999- Present	Active member of Illinois Society of Orthodontist
1999- Present	Active member of Midwest Society of Orthodontist
2002- Present	Active member of American Dental Educator Association
2002- Present	Manuscript Reviewer, American Journal of Orthodontics and Dentofacial Orthopedics
2004- Present	Manuscript Reviewer, Angle Orthodontist Journal
2005- Present	Manuscript Reviewer, Journal of American Dental Association
2013- Present	Manuscript Reviewer, Progress in Orthodontics
2013- Present	Manuscript Reviewer, Orthodontics & Craniofacial Research
2014- Present	Manuscript Reviewer, Journal of World Federation of Orthodontics.
2016- Present	Manuscript Reviewer, Journal of Dentistry Indonesia
2017- Present	College of Dentistry, Univ of Illinois at Chicago, Faculty Tenure and Promotion Committee
2017-2018	Interim Chair and Program Director, Department of Orthodontics, University of Illinois Chicago Chicago, IL

Honors

1998	Asian Pacific Orthodontic Congress, Taipei. Winner of Young Investigator Research Competition.
1999	American Association of Orthodontists, San Diego. Research Award of Special Merit.
2003	American Association of Orthodontists, Honolulu. 2nd Place Winner Table Clinic Competition
2013	Illinois Society of Orthodontists, Teacher of the Year Award, Chicago, IL

C. Contributions to Science

Selected peer-reviewed publications

1. With my background as computer science engineer, in work as academician, educator and clinician revolved around computerized diagnostic and digital imaging technology. Since 1998, majority of my research revolved around utilization of 3D technology and its clinical application as part of translational research especially in the area of craniofacial research.

1. Kusnoto B, Evans CA. "The reliability of 3D computer-generated cephalometric measurements: a comparison with direct and CT-scan measurements." In: McNamara JA, Jr., Ferrara A: Growth Modification: What works, what doesn't, and why. Ed. JA McNamara, Jr., A Ferrara. *Craniofacial Growth Series*. 35:229-46, Ann Arbor, The University of Michigan Press, 1999.
2. Kusnoto B, Evans CA, BeGole EA, De Rijk W. "Assessment of 3-dimensional computer generated cephalometric measurements." *Am J Orthod Dentofacial Orthop*. 116:390-9, 1999.
3. Kusnoto B, Figueroa AA, Polley JW. "A longitudinal three-dimensional evaluation of the growth pattern in hemifacial microsomia treated by mandibular distraction osteogenesis: a preliminary report." *J Craniofac Surg*. 10:480-6, 1999.
4. El-Bialy T, Evans CA, Kusnoto B, Dessner S, Razdolsky Y. "Three-dimensional analysis of changes after mandibular osteodistraction." In McNamara JA, Jr., Ferrara A: Growth Modification: What works, what doesn't, and why. *Craniofacial Growth Series* 35:246-56, Ann Arbor, University of Michigan Press, 1999.
5. Kusnoto B. "Utilization of 3D cephalometric finite elements modeling for measuring human facial soft tissue thickness." *Forensic Sci Comm*. 2:2, 2000.
6. Kusnoto B, Evans CA. "Reliability of a 3D surface laser scanner for orthodontic applications." *Am J Orthod Dentofacial Orthop*. 122:342-8, 2002.
7. Kusnoto B. "Advances of 3D digital imaging in orthodontics." *Korean J Orthod*. 32:375-82, 2002.
8. Da Silveira AC, Daw JL, Kusnoto B, Evans C, Cohen M. "Craniofacial applications of three-dimensional laser surface scanning." *J Craniofac Surg*. 14:449-56, 2003.
9. Kusnoto B, Evans CA, Poernomo S, Sahelangi P. "Utilization of 3D cephalometric finite elements modeling for measuring human facial soft tissue thickness." In: *Computer Graphic Facial Reconstruction*. Ed. M Marks, J Clement. 221-38, 2005.

2. In 2006-2012, while continuing research in digital imaging, I explore various clinical research utilizing mini-implant/ temporary anchorage device as well as clear aligner technology to broaden the clinical application of patient care. Various publication in international referred journals were the result of almost 6 years of works.

10. Kravitz ND, Kusnoto B. "Risks and complications of orthodontic miniscrews." *Am J Orthod Dentofacial Orthop*. 131:43-51, 2007.
11. Kravitz ND, Kusnoto B, Hohlt WF. "A simplified stent for anterior miniscrew insertion." *J Clin Orthod*. 41:224-6, 2007.
12. Yeh C, Kusnoto B, Viana G, Evans CA, Drummond JL. "In-vitro evaluation of frictional resistance between brackets with passive-ligation designs." *Am J Orthod Dentofacial Orthop*. 131:704. e11-e22, 2007.
13. Kusnoto B. "Two dimensional cephalometry and computerized orthognathic surgical treatment planning." *Clin Plast Surg*. 34:417-26, 2007.

14. Kravitz ND, Kusnoto B. "Posterior impaction with orthodontic miniscrews for openbite closure and improvement of facial profile." *World J Orthod*. 8:157-66, 2007.
15. Kravitz ND, Kusnoto B, BeGole E, Obrez A, Agran B. "How well does Invisalign work? A prospective clinical study evaluating the efficacy of tooth movement with Invisalign." *Am J Orthod Dentofacial Orthop*. 135: 27-35, 2009.
16. Duabis R, Kusnoto B, Natarajan R, Zhou L, Evans CA. "Factors affecting stresses in cortical bone around miniscrew implants A three-dimensional finite element study." *Angle Orthod.* 82:875-880, 2012.
17. Al-Sanea R, Kusnoto B, Evans CA. "3D facial soft tissue changes due to orthodontic tooth movement." In: Bourzgui F. *Orthodontics - Basic Aspects and Clinical Considerations*. ISBN 978-953-51-0143-7, InTech, March 3, 2012.

3. In 2014-2016, with the opportunity to work with well funded NIH group from Univ of Chicago and Argonne Lab, during my 9 months of sabbatical leave, I had the opportunity immerse myself in the development as well as clinical application in the area of 3D CBCT imaging technology, in which, we managed to reduce the radiation dosage by 65-70% while maintaining the diagnostic value of those images for the purpose of dental application.

18. Z. Zhang, X. Han, J. Bian, B. Kusnoto, E. Y. Sidky, and X. Pan: Preliminary study of optimization-based image reconstruction from dental cone-beam CT data, *IEEE Nucl. Sci. Sym. & Med. Imaging Conf*. Record, DOI: 10.1109/NSSMIC.2013.6829125, 2013
19. Sagun M, Kusnoto B, Galang MT, Viana G, Evans CA. Comparison of computerized cephalometric growth prediction: a study of three methods. *J World Fed Orthod*. 4: 146-150, 2015
20. Smith TL, Kusnoto B, Galang MT, BeGole E, Obrez A. Mesio-distal tip and facio-lingual torque outcomes in computer-driven orthodontic appliances. *J World Fed Orthod*. 4: 63-70, 2015.
21. Kusnoto B, Kaur P, Salem A, Zhang Z, Galang MT, Viana G, Evans CA, Manasse R, Monahan R, BeGole E, Abood A. Implementation of ultra-low dose CBCT for routine 2D orthodontic diagnostic radiographs: cephalometric landmark identification and image quality assessment. *Semin Orthod.* 21: 233-247, 2015.
22. Sfogliano L, Abood A, Viana G, Kusnoto B. Cephalometric evaluation of postero-anterior projection of reconstructed 3D CBCT, 2D conventional radiograph and direct measurements. *J World Fed Orthod*. 5; 22-27, 2016. ttp://dx.doi.org/10.1016/j.ejwf.2015.12.001

4. Started in 2008, after years of work, with the help of Foundation of Modern Bioprogressive, I also managed to complete the 10 years journey of digitally archiving as well as data mining project (cataloging and categorization) of the treatment philosophy of Bioprogressive (Dr R.M. Ricketts), a collection of Big data of over 30,000 cases world wide treated with similar philosophy for early treatment and early intervention for managing dental malocclusion. This work continues and being used as baseline of many research projects thereafter (2015-2018).

23. Dobbins-Zervas E, Kusnoto B, Galang MT, Viana G, Oppermann N, Sanchez F, Obrez A, Romero EG. Change in the Vertical Dimension of Class II Division I Patients After Use of Cervical- or High-Pull Headgear. Accepted for publication to *Am J Orthod Dentofac Orthop*, Dec 2016 (AJODO-D-15-00434R3)
24. Piskai-Conroy C, Galang MT, Obrez A, Viana G, Oppermann N, Sanchez N, Edgren B, Kusnoto B. Assessment of Vertical Changes During Palatal Expansion using Quad Helix or Bonded Rapid Palatal Expander. *Angle Orthod*, http://www.angle.org/doi/abs/10.2319/112315-799. 2016.
25. Nation L, Sanchez F, Oppermann N, Galang-Boquiren M, Viana M, Kusnoto B. Vertical characteristics of posterior teeth in untreated malocclusions. World Federation of Orthodontists. https://doi.org/10.1016/j.ejwf.2019.03.001

5. Early 2018 – current, continuing the data mining project which now evolved to be Big-Data analytic, I have the opportunity to work with Dental-Monitoring, an Artificial Intelligence product in the area of dentistry, to help assessing treatment progress via teledentistry. This milestone is becoming very useful particularly in the era of COVID 19 pandemic while access to care, especially for continuation of care as well as monitoring of emergency and elective procedures become somehow limited (due to physical/ social distancing).

26. Morris R, Hoye L, Elnagar M, Atsawasuwan P, Galang-Boquiren M, Caplin J, Viana G, Obrez A, Kusnoto B. Accuracy of Dental Monitoring™ 3D Digital Dental Models Using Photo and Video Mode. American Journal of Orthodontics and Dentofacial Orthopedics, 156(3), 420-428. doi:10.1016/j.ajodo.2019.02.014
27. Elnagar MH, Aranovich S, Kusnoto B. Digital Workflow for Combined Orthodontics and Orthognathic Surgery. Oral and Maxillofacial Surgery Clinics of North America, 32(1), 1-14. doi:10.1016/j.coms.2019.08.004. 2019
28. Talaat S, Kaboudan A, Talaat W, Kusnoto B, Sanchez F, Elnagar MH, Bourauel C. Improving the accuracy of publicly available search engines in recognizing and classifying dental visual assets using convolutional neural networks.. International journal of computerized dentistry, 23(3), 211-218. 2020
29. Masoud AI, Alwadei FH, Alwadei AH, Lin EY, Viana MGC, Kusnoto B, Evans CA. Developing pediatric three-dimensional upper airway normative values using fixed and interactive thresholds. Oral Radiol. 36(1); 89-99, 2020
30. Talaat S, Kaboudan A, Talaat W, Kusnoto B, Sanchez F, Elnagar MH, Ghoneima A. The validity of an artificial intelligence application for assessment of orthodontic treatment need from clinical images. Seminars in Orthodontics, 27(2), 164-171. doi:10.1053/j.sodo.2021.05.012. 2021

31. Bulatova G, Kusnoto B, Viana G, Tsay TP, Avenetti DM, Sanchez F. Assessment of automatic cephalometric landmark identification using artificial intelligence. Orthodontics and Craniofacial Research, 24(S2), 37-42. doi:10.1111/ocr.12542. 2021
32. Makki A, Elnagar MH, Sanchez F, Caplin J, Viana G, Kusnoto B. of Handicapping Labio-Lingual Deviation index scoring methods and their effect on orthodontic treatment coverage by Medicaid. Journal of Public Health Dentistry. doi:10.1111/jphd.12505. 2022

Complete List of Published Work in My Bibliography:
https://www.ncbi.nlm.nih.gov/myncbi/budi.kusnoto.1/bibliography/public/

Invited Lectures

10th Anniversary Faculty of Dentistry YARSI University, Indonesia. Keynote speakers. The Impact of Competency based dental education in improving the quality standard of oral healthcare. September 16, 2022.

4th Moestopo University Scientific Event. Jakarta, Indonesia. August 15, 2020

National Orthodontic Lecture Series Al-Azhar University, Cairo, Egypt. July 2nd, 2020

American Association of Orthodontists 2019 Annual Session. Speakers

D. Additional Information: Research Support and/or Scholastic Performance
Research Support

Ongoing Research Support

1. Internal Research Award from UIC COD. Comparison study of various digital imaging techniques for orthodontic diagnosis and record The goal is to improve efficiency when utilizing digital imaging for complete orthodontic diagnostic records 2002-2005. Funded. Key personnel : Kusnoto B.
2. American Association of Orthodontists Foundation. Optimizing Orthodontic Appliances Efficiency with Remote Dental Monitoring and Artificial Intelligence Algorithms", Institution: University of Illinois Chicago. Obligated total: USD 20,000; 7/1/2021 - 6/30/2022. Award Status: ACTIVE. Role: Funded by. Key personnel: Allareddy V; Kusnoto B; Atsawasuwan P.
3. American Association of Orthodontists Foundation. Evaluation of Anterior Open Bite Treatment. Strategies and Outcomes Using Artificial Intelligence. Institution: University of Illinois at Chicago. Lead Administrating Unit: Orthodontics-C. . Obligated total: USD 20,000; Anticipated Total: USD 20,000. Funding type: Contract. 7/1/2020 - 6/30/2022. Award Status: Active. Role: Co-investigator. Key personnel: Sanchez F; Allareddy V; Elnagar M; Kusnoto B; Miloro M.
4. American Association of Orthodontists Foundation. Assessment of Automatic Cephalometric Landmark Identification Using Artificial Intelligence Deep Learning Convolutional Neural Networks, Institution: University of Illinois at Chicago. Lead Administrating Unit: Orthodontics-C. Amount of funding requested: USD 29,056 Funding type: New 7/1/2019 - 6/30/2020 Award Status: Awarded Role: Senior/key personnel. Key personnel: Sanchez F; Viana MG; Kusnoto B

Completed and Non funded Research Support

1. Orthodontic Research Grants from Rocky Mountain Orthodontics and Foundation
   Dr. R.M. Ricketts Data Mining Project. The goal of our project is to develop a web-based system composed of a data engine and the necessary related infrastructure for use as a standard enabling the integration of orthodontic research data, derived from the precious collections of the late Dr. Robert M. Ricketts. A web-based data engine system will be developed to benefit orthodontic researchers and clinicians. Key personnel : Kusnoto B. 2005-2009. Funded
2. American Association of Orthodontists Foundation. Shape Memory Polymer for Orthodontic Appliances: A Novel Approach. Institution: University of Illinois at Chicago. Lead Administrating Unit: Orthodontics-C. Amount of funding requested: USD 30,000. 7/1/2017 - 6/30/2018. Award Status: Not funded Role: Principal investigator. Key personnel: Kusnoto B; Atsawasuwan P; Bedran-Russo A
3. Align Technology. Efficacy of Dental- Monitoring System in Invisalign Treatment. Institution: University of Illinois at Chicago. Lead Administrating Unit: Orthodontics-C. Amount of funding requested: USD 25,000. 7/1/2017 - 6/30/2018. Award Status: Not funded. Role: Principal investigator. Key personnel: Kusnoto B