

List of research topics for NII International Internship Program 2023 2nd Call

No.	Research Area	Title of the Research	Website	Name of Supervisor	Title of the supervisor	Requirements for Applicants: Master / Ph.D. Student	Total Number of Acceptance per Supervisor	Duration : 2-6months (less than 180days)	Comments
1. Principles of Informatics Research Division									
P00301	Knowledge Representation and Reasoning	Integration of Knowledge Representation and Machine Learning	http://research.nii.ac.jp/il/	Katsumi Inoue	Professor	Ph.D.	3	3 - 6 months	Knowledge in KR&R (e.g., abduction, ASP, belief change, causality, commonsense reasoning, explanation, SAT) as well as machine learning (e.g., classification, inductive logic programming, LLM, neurosymbolic AI) are advantageous to tackle this subject. Experience in algebraic computation is useful too. Please specify which KR&R and ML methods can be integrated in the proposal.
P00302	Knowledge Representation and Reasoning	Theory, Extension and Applications of Learning from Interpretation Transition	http://research.nii.ac.jp/il/	Katsumi Inoue	Professor	Ph.D.	3	4 - 6 months	Basic knowledge of symbolic AI and machine learning is required. Experiences in topics such as Boolean networks, causality, cellular automata, model checking, time series analysis and transformers are welcome. Please specify how LFIT is applied or extended in the proposal.
P00303	Knowledge Representation and Reasoning	Reasoning Techniques for Handling Inconsistent Information	http://research.nii.ac.jp/il/	Katsumi Inoue	Professor	Ph.D.	3	5 - 6 months	Some experience of research on KR&R is requested. This topic is guided with help of Dr. Meghyn Bienvenu.
P01001	AI and Law	legal reasoning		Ken Satoh	Professor	Either	3	2 - 3 months	Strong background of logic and/or law is necessary
P01002	AI and Law	legal NLP		Ken Satoh	Professor	Either	3	2 - 3 months	Strong background of NLP and/or law is necessary
P01003	AI and Law	Norm Compliance Mechanism		Ken Satoh	Professor	Either	3	2 - 3 months	Strong background of logic and/or law is necessary
P01101	Machine learning	Geometric analysis of machine learning models	https://mahito.nii.ac.jp	Mahito Sugiyama	Associate Professor	Ph.D.	2	3 - 6 months	Legendre decomposition (information geometric tensor decomposition): https://arxiv.org/abs/1802.04502 A potentially relevant and interesting literature: https://openreview.net/forum?id=3dqwXb1te4
P01102	Machine learning	Geometric analysis of T-PRISM, a logic programming language based on tensor embedding for statistical modeling	https://mahito.nii.ac.jp	Mahito Sugiyama	Associate Professor	Ph.D.	2	3 - 6 months	Legendre decomposition (information geometric tensor decomposition): https://arxiv.org/abs/1802.04502 T-PRISM: https://github.com/prismpl/prism
P01201	Artificial Intelligence	Artificial Social Intelligence: building intelligence systems with social knowledge and social interaction	http://www-kasm.nii.ac.jp/~takeda	Hideaki Takeda	Professor	Either	3	3 - 6 months	
P01301	software verification	separation logic	http://research.nii.ac.jp/~tatsuta/index-e.html	Makoto Tatsuta	Professor	Either	2	2 - 6 months	
P02001	Theoretical Computer Science	Sensitivity Analysis/Lipschitz Continuous Algorithms	https://arxiv.org/abs/2211.04674 https://arxiv.org/abs/2111.02657	Yuichi Yoshida	Professor	Ph.D.	2	2 - 6 months	
P02002	Data Mining	Sensitivity Analysis/Lipschitz Continuous Algorithms	https://openreview.net/forum?id=VM7u8ecLrZV https://openreview.net/forum?id=boik01yhssB	Yuichi Yoshida	Professor	Ph.D.	2	2 - 6 months	

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P02003	Theoretical Computer Science	Spectral Graph Theory for Directed Graphs and Hypergraphs	https://arxiv.org/abs/2106.02353 https://arxiv.org/abs/2201.07289	Yuichi Yoshida	Professor	Ph.D.	2	2 - 6 months	
P02004	Theoretical Computer Science	Sublinear-time Algorithms	https://arxiv.org/abs/2204.08404 https://arxiv.org/abs/2210.12601	Yuichi Yoshida	Professor	Ph.D.	2	2 - 6 months	
P02101	Computational Complexity Theory	Meta-complexity, average-case complexity, pseudorandomness, and the Minimum Circuit Size Problem	https://eccc.weizmann.ac.il/report/2022/119/ https://eccc.weizmann.ac.il/report/2021/058/	Shuichi Hirahara	Associate Professor	Either	2	2 - 6 months	It is desirable that applicants have a conference publication in complexity theory.
P03401	Robotics	Imitation learning for robot control		Taisuke Kobayashi	Assistant Professor	Either	1	4 - 6 months	Develop a robot controller using imitation learning technologies
P03501	Quantum information	Making a general framework to explore large-scale quantum programs		Akihito Soeda	Associate Professor	Either	2	2 - 6 months	
P03502	Quantum information	Making more accurate physical models to describe quantum information processing devices		Akihito Soeda	Associate Professor	Either	2	2 - 6 months	

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2. Information Systems Architecture Science Research Division									
A00301	Machine Learning, Deep Learning, Software Engineering, Testing and Debugging	Risk-Aware Repair Techniques for Deep Neural Networks	http://research.nii.ac.jp/~f-ishikawa/en/lab.html	Fuyuki Ishikawa	Associate Professor	Either	5	2 - 6 months	
A00302	Software Engineering, Testing and Debugging, Cyber-Physical Systems, AI Systems	Smart Testing and Debugging for Cyber-Physical and Intelligent Systems	http://research.nii.ac.jp/~f-ishikawa/en/lab.html	Fuyuki Ishikawa	Associate Professor	Either	5	2 - 6 months	
A00501	Database Programming Languages	Tackling View Update Problems based on Bidirectional Transformation using Datalog expressions.	https://researchmap.jp/katohiroyuki	Hiroyuki Kato	Associate Professor	Either	2	2 - 6 months	
A00601	Wireless and Mobile Networks, Sensing, Signal Processing, Machine Learning	Energy-efficient edge AI-based wireless networks design for Beyond 5G	http://research.nii.ac.jp/~megkaneko/	Megumi Kaneko	Associate Professor	Either	3	4 - 6 months	Required programming skills: Matlab, Python. Basic knowledge in wireless/digital communications and signal processing is required.
A00602	Wireless and Mobile Networks, Sensing, Signal Processing, Machine Learning	Integrated terrestrial and spatial wireless communications for Beyond 5G and 6G	http://research.nii.ac.jp/~megkaneko/	Megumi Kaneko	Associate Professor	Either	3	4 - 6 months	Required programming skills: Matlab, Python. Basic knowledge in wireless/digital communications and signal processing is required.
A00603	Wireless and Mobile Networks, Sensing, Signal Processing, Machine Learning	Exploiting TeraHertz bands for 6G wireless communications and sensing	http://research.nii.ac.jp/~megkaneko/	Megumi Kaneko	Associate Professor	Either	3	4 - 6 months	Required programming skills: Matlab, Python. Basic knowledge in wireless/digital communications and signal processing is required.
A00801	Wireless communication	Resource management in beyond 5G and 6G wireless networks	https://klab.nii.ac.jp	Yusheng Ji	Professor	Either	2	3 - 6 months	Understanding of wireless communications and basic knowledge on optimization are required.
A00802	Networking	AI/ML for networking	https://klab.nii.ac.jp	Yusheng Ji	Professor	Either	2	3 - 6 months	Experience in machine learning (deep learning, reinforcement learning, or federated learning etc.) is preferred.
A01201	Programming languagesProgram verification	Type-Based Temporal Verification and Its Automation	https://researchmap.jp/t-sekiym?lang=en	Taro Sekiyama	Associate Professor	Either	4	3 - 6 months	This topic aims to an advanced type-based approach to verification of temporal properties, a class of properties about sequences of events, called traces. Real-world programs involve not only pure computation but also side effects, and many side effects have certain disciplines to be met. For example, file resources need to be opened first, and read from and write to them should be done before closing them, and opened files should be closed eventually. In this example, "open", "read", "write", and "close" are regarded as events on files, and the discipline of files to be met can be described as temporal properties about sequences (i.e., traces consisting) of such events. In this topic, we study 1) theory of temporal verification for higher-order programs and 2) implementation of verifiers to automate the temporal verification.
A01202	Programming languagesProgram verification	Advanced Type Systems for Computational Effects	https://researchmap.jp/t-sekiym?lang=en	Taro Sekiyama	Associate Professor	Either	4	3 - 6 months	Real-world programs involve many side effects, such as memory and file manipulation, nondeterminism, concurrency, nondeterminism, and probability. This topic aims to study advanced type systems for verifying such effectful programs uniformly. As a uniform mean to express side effects, we plan to focus on algebraic effect handlers, an emerging construct to model a variety of side effects. The expressivity of algebraic effect handlers comes from the ability to manipulate the notion of continuations. Therefore, type systems to be studied need to verify effectively how continuations are used. There are many directions and potentials to advance such type systems for algebraic effect handlers (the details will be discussed with applicants).

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A01203	Program verificationMachine learning	Program verification with machine learning	https://arxiv.org/abs/2107.09766	Taro Sekiyama	Associate Professor	Either	4	2 - 6 months	This topic aims to enhance tools for program verifications with the help of machine learning (especially, reinforcement learning). The spots we target include safety verification, relational verification, and termination/non-termination analysis, but not limited to them. This topic encourages applicants to apply a good research cycle of implementation, evaluation, investigation, and improvement.
A01701	Theoretical Computer Science	Categorical Foundation of Model Checking	https://group-mmm.org/~ichiro/	Ichiro Hasuo	Professor	Either	2	3 - 6 months	<p>Fixed-point specifications (such as in LTL and modal μ-calculus) have been conventionally studied in terms of finitary and combinatory structures (automata, games, etc.). These observations are recently being transferred to more abstract settings, opening up algorithms and proof methods for new application domains (esp. probabilistic, metric, etc.). There are a number of research questions waiting to be answered, both theoretical and algorithmic.</p> <p>References (you'll work on one line): - Fibrational line: [Komorida, Katsumata, Hu, Klin, Hasuo, LICS'19], [Komorida, Katsumata, Kupke, Rot, Hasuo, LICS'21], [Kori, Hasuo, Katsumata, CONCUR'21] - PDR line: [Kori+, CAV'22], [Kori+, CAV'23] - compositionality line: [Watanabe+, CAV'23]</p> <p>## Desired: familiarity with mathematical and abstract reasoning used in logic, lattice theory and (possibly) category theory</p> <p>## Interested? Please first consult https://group-mmm.org/eratommmsd/internship-students/ (don't write an email to me)</p>
A01702	Theoretical Computer Science	Logical guidance in optimization metaheuristics	https://group-mmm.org/~ichiro/	Ichiro Hasuo	Professor	Either	2	3 - 6 months	<p>Many real-world optimization problems have inherent logical and discrete structures, but many optimization metaheuristics (stochastic optimization, hill-climbing, evolutionary computation, etc.) do not make explicit use of such structures. We have used hierarchical optimization frameworks where the upper logical layer guides the lower metaheuristics layer for efficiency and explainability. The goal is to push the idea further in other applications and theoretical foundations.</p> <p>References: [Zhang, Hasuo, Arcaini, CAV'19], [Zhang, Ernst, Sedwards, Arcaini, Hasuo, EMSOFT'18]</p> <p>Desired: familiarity with, or eagerness to learn, 1) formal logic, 2) optimization metaheuristics, 3) statistical machine learning</p> <p>Interested? Please first consult https://group-mmm.org/eratommmsd/internship-students/ (don't write an email to me)</p>

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A01703	Theoretical Computer Science	Logical safety for automated driving	https://group-mmm.org/~ichiro/	Ichiro Hasuo	Professor	Either	2	3 - 6 months	<p>Responsibility-sensitive safety (RSS) is a recently proposed methodology for devising mathematically-guaranteed safety rules for automated driving. The candidate will work on its logical foundations and its application to various driving scenarios. The work is much like interactive theorem proving, but with unique theoretical challenges (e.g. continuous dynamics) and a hot application (automated driving).</p> <p>References: [Hasuo, Eberhart, Haydon, et al., IEEE Trans. Intelligent Vehicles, '23 (available at arXiv)] [Shalev-Shwartz, Shammah, Shashua, arXiv'17]</p> <p>Desired: familiarity with formal logic and interactive theorem proving, passion for bringing theory to practice</p> <p>Interested? Please first consult https://group-mmm.org/eratommmsd/internship-students/ (don't write an email to me)</p>
A01801	Computer network	Network security measurement and analysis	http://www.flab.nii.ac.jp/internship	Kensuke Fukuda	Professor	Master	3	5 - 6 months	Solid programming (python or C++) skills
A01802	Computer network	Network management (log and config analysis)	http://www.flab.nii.ac.jp	Kensuke Fukuda	Professor	Either	3	5 - 6 months	Solid programming (python or C++) skills
A01803	Computer network	Network anomaly detection	http://www.flab.nii.ac.jp/internship	Kensuke Fukuda	Professor	Either	3	5 - 6 months	Solid programming (python or C++) and machine learning skills

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3. Digital Content and Media Sciences Research Division									
K00101	Text Media	Language Models and their applications to assist human activities	http://www-ai.nii.ac.jp	Akiko Aizawa	Professor	Either	4	3 - 6 months	
K00102	Text Media	Deep analysis of scientific papers	http://www-ai.nii.ac.jp	Akiko Aizawa	Professor	Either	4	3 - 6 months	
K00401	Molecular biology	Enhancing Molecular Scoring Functions for Drug Discovery: Improving QED and logP Predictions	http://research.nii.ac.jp/~andres/official/intern2023_ON_SITE_topic_1.htm	Frederic ANDRES	Associate Professor	Either	5	6 - 6 months	cooperation with the Japanese National Institute of Health Sciences (NIHS) .
K00402	Education and privacy	Ontological Rule-based Generative AI with Large Language Models (LLMs) for personal information privacy assessment	http://research.nii.ac.jp/~andres/official/intern2023_ON_SITE_topic_2.htm	Frederic ANDRES	Associate Professor	Either	5	6 - 6 months	Collaboration with ISO standardisation SC36 experts
K00403	Molecular biology	Quantum Machine Learning for Drug Discovery: Enhancing Molecular Property Prediction with Quantum Features	http://research.nii.ac.jp/~andres/official/intern2023_ON_SITE_topic_3.htm	Frederic ANDRES	Associate Professor	Either	5	6 - 6 months	cooperation with the Japanese National Institute of Health Sciences (NIHS) .
K00404	Molecular biology	Customizing a tailored drug according to personalized treatments	http://research.nii.ac.jp/~andres/official/intern2023_ON_SITE_topic_4.htm	Frederic ANDRES	Associate Professor	Either	5	6 - 6 months	cooperation with the Japanese National Institute of Health Sciences (NIHS) .
K00405	Data Science	A Model Non-constrained Time-data Manipulation Extendable Family of Algebras	http://research.nii.ac.jp/~andres/official/intern2023_ON_SITE_topic_5.htm	Frederic ANDRES	Associate Professor	Either	5	6 - 6 months	Cooperation with IRISA Lab (France)
K00501	3D Computer Vision, Photometric Stereo	1. Multi-view Universal Photometric StereoExtending the universal photometric stereo network (Ikehata, CVPR2023) to a multi-view setup for reconstructing the entire 3-D shape of an object. 2. Designing the acquisition setup for the universal photometric stereoDesigning an optical system that suits for the universal photometric stereo image acquisition.3. Topics related to 3-D computer visionIf you consider any specific topics that are related to 3-D computer vision, please describe detailed proposal.	- My homepage https://satoshi-ikehata.github.io/ - SDM-UniPS(CVPR2023) https://github.com/satoshi-ikehata/SDM-UniPS-CVPR2023	Satoshi Ikehata	Assistant Professor	Either	1	3 - 6 months	
K01001	Digital Humanities	Machine learning for image processing (esp. character recognition), geographic information, linked data, and metadata management for cultural heritage	http://agora.ex.nii.ac.jp/~kitamoto/education/internship/	Asanobu Kitamoto	Professor	Either	4	3 - 6 months	
K01002	Earth Environmental Informatics	Big data analytics (esp. image processing, remote sensing, and machine learning) for solving environmental and societal problems	http://agora.ex.nii.ac.jp/~kitamoto/education/internship/	Asanobu Kitamoto	Professor	Either	4	3 - 6 months	
K01003	Crisis Informatics	Big data analytics (esp. image processing, natural language processing, and machine learning) for natural disasters and crisis	http://agora.ex.nii.ac.jp/~kitamoto/education/internship/	Asanobu Kitamoto	Professor	Either	4	3 - 6 months	
K01004	Open Science	Research on a new trend in science, such as open data, data citation, citizen science, and open innovation	http://agora.ex.nii.ac.jp/~kitamoto/education/internship/	Asanobu Kitamoto	Professor	Either	4	3 - 6 months	

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K01301	Computer Vision and Computer Graphics	Computational Photography: Deep learning, Image-based rendering, Image processing, Color analysis, Spectral imaging	http://research.nii.ac.jp/~imarik/ http://research.nii.ac.jp/pbv/	Imari Sato	Professor	Either	2	5 - 6 months	A basic knowledge of Image Analysis and/or Machine learning, and good programming skills are required.
K01302	Computer Vision and Application	3D medical image analysis, Deep learning, Image processing, Color analysis, Spectral imaging	http://research.nii.ac.jp/~imarik/ http://research.nii.ac.jp/pbv/	Imari Sato	Professor	Either	2	5 - 6 months	A basic knowledge of Image Analysis and/or Machine learning, and good programming skills are required.
K01401	Content-Based Image and Video Analysis	video and image search (esp. TRECVID AVS task. see: https://trecvid.nist.gov/)	http://www.satoh-lab.nii.ac.jp/	Shin'ichi Satoh	Professor	Either	3	3 - 6 months	Ph.D. students preferred
K01402	Content-Based Image and Video Analysis	Automatic question answering about videos (esp. TRECVID Deep Video Understanding (DVU). see: https://trecvid.nist.gov/)	http://www.satoh-lab.nii.ac.jp/	Shin'ichi Satoh	Professor	Either	3	3 - 6 months	Ph.D. students preferred
K01403	Content-Based Image and Video Analysis	Landmark image retrieval, e.g., Google Landmark Image Retrieval https://www.kaggle.com/c/landmarkretrieval-2020 .	http://www.satoh-lab.nii.ac.jp/	Shin'ichi Satoh	Professor	Either	3	3 - 6 months	Ph.D. students preferred
K01404	Content-Based Image and Video Analysis	Multimodal classification of textbook illustrations to make them accessible to children with disabilities(this topic will be jointly supervised by Camille Guinaudeau (Paris Saclay University) and Shin'ichi Satoh (NII))	http://www.satoh-lab.nii.ac.jp/ https://hackmd.io/@Camille-Guinaudeau/H1tMAfVRn	Shin'ichi Satoh	Professor	Either	3	4 - 6 months	Ph.D. students preferred
K01601	computer vision	One of the following topics (but not limited to):(1) 3D vision,(2) Human activity recognition, (3) Vision and language, (4) Object detection and segmentation from video using deep learning, (5) Image/video generation using deep learning.	http://www.dgcv.nii.ac.jp	Akihiro Sugimoto	Professor	Either	5	3 - 6 months	Longer duration is better. Rigorous background on mathematics is required. Strong programming skills on image processing and computer vision are also required. In the case of Master course students, highly motivated students who can stay for 6 months are preferable. Students who are willing to pursuit ph D at NII are preferable as well. Potential applicants should send your CV and research interests/proposals directly to Prof. Sugimoto before your application.
K01602	digital geometry	(1) Discretization model of geometric shape, (2) Discrete shape fitting to noisy integer points,(3) Any proposed topic related with digital geometry.	http://www.dgcv.nii.ac.jp	Akihiro Sugimoto	Professor	Either	5	3 - 6 months	Rigorous background on mathematics as well as computer vision is required. In particular, strong knowledge on linear algebra, graph theory, and number theory is important requirements. Programming skills on image processing or computer vision are also required. Potential applicants should send your CV and research interests/proposals directly to Prof. Sugimoto before your application.
K01701	Data Mining	Recommender System	https://www.tlab.nii.ac.jp/	Atsuhiko Takasu	Professor	Either	4	4 - 6 months	
K01702	Data Mining	Tabular Data Analysis	https://www.tlab.nii.ac.jp	Atsuhiko Takasu	Professor	Either	4	4 - 6 months	
K01703	Data Mining	Sequence Data Mining	https://www.tlab.nii.ac.jp	Atsuhiko Takasu	Professor	Either	4	4 - 6 months	
K02001	Deep Learning, Time Series Analysis	Time Series Analysis for Bitcoin Market Prediction	http://research.nii.ac.jp/~prendinger/papers/FY2023(2)_Topics.html	Helmut PRENDINGER	Professor	Either	6	4 - 6 months	Our goal is to investigate Deep Learning (DL) models, such as Transformers, and other methods (e.g., Convergent Cross Mapping), for predicting the price development of Bitcoin and other cryptocurrencies.

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K02002	Large Language Models (LLM), ChatGPT	Large Language Models for Bitcoin Market Prediction	http://research.nii.ac.jp/~prendinger/papers/FY2023(2)_Topics.html	Helmut PRENDINGER	Professor	Either	6	4 - 6 months	We aim to understand the potential of LLMs for predicting the price action of Bitcoin. The success of ChatGPT has inspired LLMs dedicated to finance, such as BloombergGPT or FinGPT. We want to investigate how LLMs can complement Deep Learning based technical chart analysis for improving the accuracy of Bitcoin price development.
K02003	Token Economy, Blockchain	Market Design for Unmanned Aircraft Systems ("drone") Traffic Management (UTM)	http://research.nii.ac.jp/~prendinger/papers/FY2023(2)_Topics.html	Helmut PRENDINGER	Professor	Either	6	4 - 6 months	We are developing a prototype of the entire UTM system to manage drone air traffic, and conduct related simulation studies. Recently, we got interested in market design for UTM, based on ideas from token economy (Web3). The project aims to investigate the feasibility of introducing a UTM related token to the UTM eco-system.
K02301	Speech processing	Privacy preserving processing for speech signals using speaker anonymized and differential privacy techniques	Relevant but not limited to [1] For background, please check Tomashenko, N. et al. The VoicePrivacy 2020 Challenge: Results and findings. Comput. Speech Lang. 101362 (2022) doi:10.1016/j.csl.2022.101362. [2] For related method, please check Shamsabadi, et al. https://arxiv.org/pdf/2202.11823.pdf	Junichi Yamagishi	Professor	Ph.D.	6	4 - 6 months	The successful candidate should be a PhD student in speech processing, computer science, or a related discipline. He or she should have strong programming skills. Familiarity with DNN tools (e.g., Pytorch) and speech tools are preferable. Supervision teams include Dr. Xin Wang.
K02302	Speech processing	Robust deepfake speech detection based on likelihood ratio and generative models	Relevant but not limited to [1] For background, please check https://www.asvspoof.org and this practical guide https://arxiv.org/abs/2201.03321 [2] For related methods, please check Chen, et al., https://doi.org/10.1109/SLT48900.2021.9383572 [3] Another related method is Sizov, et al., https://doi.org/10.1109/TIFS.2015.2407362	Junichi Yamagishi	Professor	Ph.D.	6	4 - 6 months	The successful candidate should be a PhD student in speech processing, computer science, or a related discipline. He or she should have strong programming skills. Familiarity with DNN tools (e.g., Pytorch) and speech tools are preferable. Supervision teams include Dr. Xin Wang.
K02303	Music processing	Expressive and controllable multi-instrument musical audio generation using deep learning	Relevant papers include, but are not limited to: [1] Xuan Shi, Erica Cooper, Junichi Yamagishi, "Use of speaker recognition approaches for learning and evaluating embedding representations of musical instrument sounds," IEEE/ACM Trans. ASLP, Jan 2022, [2] Erica Cooper, Xin Wang, Junichi Yamagishi, "Text-to-Speech Synthesis Techniques for MIDI-to-Audio Synthesis," SSW 2021, and [3] Wu et al., ICLR 2022, "MIDI-DDSP: Detailed Control of Musical Performance via Hierarchical Modeling."	Junichi Yamagishi	Professor	Ph.D.	6	4 - 6 months	The successful candidate should be a PhD student in speech or music signal processing, computer science, or a related discipline. He or she should have strong programming skills and experience with speech and audio processing and/or machine learning. • Familiarity with DNN tools and speech tools are preferable. Supervision teams include Dr. Erica Cooper.
K02304	Speech processing	Automatic evaluation of synthesized speech from multiple domains	Relevant papers include, but are not limited to: [1] Erica Cooper, Wen-Chin Huang, Tomoki Toda, Junichi Yamagishi, "Generalization Ability of MOS Prediction Networks" (ICASSP 2022) and [2] Wen-Chin Huang, Erica Cooper, Yu Tsao, Hsin-Min Wang, Tomoki Toda, Junichi Yamagishi, "The VoiceMOS Challenge 2022" (Interspeech 2022).	Junichi Yamagishi	Professor	Ph.D.	6	4 - 6 months	The successful candidate should be a PhD student in speech or music signal processing, computer science, or a related discipline. He or she should have strong programming skills and experience with speech and audio processing and/or machine learning. • Familiarity with DNN tools and speech tools are preferable. Supervision teams include Dr. Erica Cooper.
K02305	Speech processing	Multi-modal Embedding Space Learning for Effective Large-Scale Speaker Retrieval	Relevant but not limited to [1] Speaker retrieval: https://arxiv.org/abs/1811.10812 [2] Pair-wise learning of speaker information: https://doi.org/10.1109/TASLP.2023.3268568 [3] Speaker generation: https://arxiv.org/abs/2111.05095 [4] Audio-text retrieval: https://arxiv.org/abs/2206.04769	Junichi Yamagishi	Professor	Ph.D.	6	4 - 6 months	The successful candidate should be a PhD student in speech processing, computer science, or a related discipline. He or she should have decent programming skills. Familiarity with DNN tools (e.g., Pytorch) and speech tools (e.g. Speechbrain) are preferable. Hands-on experience with large language models are strongly preferable. Supervision teams include Mr. Xuechen Liu.

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K02306	Speech processing	Improving fairness of biometric recognizers	Relevant but not limited to[1] Fairness of speech: https://doi.org/10.1109/TBIOM.2021.3102862 [2] Potential bias in current speaker recognition model: https://doi.org/10.21437/Interspeech.2020-2715 [3] Example of speech processing for special groups: https://doi.org/10.1109/TASLP.2021.3091805	Junichi Yamagishi	Professor	Ph.D.	6	4 - 6 months	The successful candidate should be a PhD student in speech processing, computer science, or a related discipline. He or she should have decent programming skills. Familiarity with DNN tools (e.g., Pytorch) and speech tools (e.g. Speechbrain) are preferable. Supervision teams include Mr. Xuechen Liu.
K02307	Speech processing	Text-to-speech synthesis for under-resourced languages	Relevant papers include, but are not limited to: [1] Dan Wells, Korin Richmond, William Lamb, "A Low-Resource Pipeline for Text-to-Speech from Found Data with Application to Scottish Gaelic" (Interspeech 2023) and [2] Orián Sharoni, Roei Shenberg, Erica Cooper, "SASPEECH: A Hebrew Single Speaker Dataset for Text to Speech and Voice Conversion" (Interspeech 2023).	Junichi Yamagishi	Professor	Ph.D.	6	4 - 6 months	The successful candidate should be a PhD student in speech or music signal processing, computer science, or a related discipline. He or she should have strong programming skills and experience with speech and audio processing and/or machine learning. • Familiarity with DNN tools and speech tools are preferable. Supervision teams include Dr. Erica Cooper
K03401	Open Science	Development and application of open scholarly knowledge graphs for open science		Chifumi Nishioka	Assistant Professor	Either	2	2 - 6 months	
K03402	Open Science	Analysis on current status of preprint publication and citation bias		Chifumi Nishioka	Assistant Professor	Either	2	2 - 6 months	
K03501	Audio processing	Physics-grounded machine learning for spatial audio recording	https://www.ap.nii.ac.jp/	Shoichi Koyama	Associate Professor	Either	2	3 - 6 months	Knowledge of deep learning, signal processing, and acoustics is required. Programming skills in Python or Julia are also required. Reference: Shigemi, et al. IWAENC 2022, Ribeiro, et al. ICASSP 2021.
K03502	Audio processing	Head-related transfer function upsampling	https://www.ap.nii.ac.jp/	Shoichi Koyama	Associate Professor	Either	2	3 - 6 months	Knowledge of deep learning, signal processing, and acoustics is required. Programming skills in Python are also required. Reference: Ito, et al. IWAENC 2022.

No.	Research Area	Title of the Research	Website	Name of Supervisor	Title of the supervisor	Requirements for Applicants: Master / Ph.D. Student	Total Number of Acceptance per Supervisor	Duration : 2-6months (less than 180days)	Comments
4. Information and Society Research Division									
J00301	Multimedia forensics	Generation and detection of fake facial videos	http://research.nii.ac.jp/~iechizen/official/research/research5-e.html	Isao Echizen	Professor	Either	15	3 - 6 months	
J00302	Multimedia security	Generation and detection of adversarial examples	http://research.nii.ac.jp/~iechizen/official/research/research5-e.html	Isao Echizen	Professor	Either	15	3 - 6 months	
J00303	Multimedia forensics	Image-based fact verification	http://research.nii.ac.jp/~iechizen/crest/en/research.html	Isao Echizen	Professor	Either	15	3 - 6 months	
J00501	Interactive Information Retrieval	Understanding and Modeling User Behaviour during Complex Search Task	The current project page has not been set up, but the previous related project page is available at; http://cres.ipn.org/?FrontPage	Noriko Kando	Professor	Either	6	2 - 6 months	The grand target of the project is to propose a mechanism to support the users conducting complex/exploratory search tasks including conversational search. As a step toward the target, several internship research tasks are prepared as following, but not limited to: 1) propose or enhance a method to assess the outcomes of the complex/exploratory search so called "search as learning" process, 2) investigate the affects of the user search behaviour in terms of dwell time, link depth, search trail, engagement, perceived task difficulty, cognitive task complexity on the learning outcome, 3) investigate the relationship between user's attributes such as domain expertise, task familiarity, time constraint, etc. and the search behaviour and the learning outcomes, 4) investigate the approach towards longitudinal learning effects, 5) building and/or enhancing the tools usable for the above mentioned 1) -4). Any other topic related to this research direction shall be considered.
J00502	Human computer Interaction, Design	Interactive user guide app for Museum using iPad	No project page is set up yet, but please refer the following to understand some aspect of the project; Y. Shoji et al., "Museum Experience into a Souvenir: Generating Memorable Postcards from Guide Device Behavior Log," 2021 ACM/IEEE Joint Conference on Digital Libraries (JCDL), Champaign, IL, USA, 2021, pp. 120-129, doi: 10.1109/JCDL52503.2021.00024.	Noriko Kando	Professor	Either	6	2 - 6 months	To enhance the prototype Interactive user guide system for Museum, 1) propose a effective ranking and recommendation mechanism based on the relationship among the artifacts, user behaviour on the app and locational move in the museum, etc. 2) conducts user experiments of the app, 3) user experiments on the design of the post card automatically produced by the guide app based on the user's behaviour during a museum visit.