

Honda Research Institute USA (HRI-US) strives to be at the cutting edge of Honda's research and development activities. Driven by Honda's global slogan – The Power of Dreams – we pursue emerging technologies and bring them into reality to make people happy by engaging daily in highly scientific, pioneering work. We realize that dreams don't come from organizations, systems, or money. They come from people, and we seek people who have such a challenging spirit to join us.

Currently, HRI-US (Silicon Valley) is offering fall/winter research internships to highly motivated Ph.D. (and qualified M.S.) students. Interns will work closely with HRI researchers, and publishing results in academic forums is highly encouraged. We are looking for candidates with good publication track records and excellent programming skills to join our team!

How to Apply: Please send an e-mail to careers@honda-ri.com with the following:

- Subject line including the job number(s) you are applying for
- A cover letter explaining how your background matches the required qualifications
- Recent CV
- Topics you are interested in (optional)

Candidates must have the legal right to work in the U.S.A.

Location: 70 Rio Robles, San Jose, CA 95134

List of Jobs: Follow the link for the detailed job description

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Perception for Robotic Manipulation (Job Number: P19INT-20)

This position focuses on formulating and developing algorithms, and running experiments to advance research in human-centered robotic manipulation in the context of home robotics. The candidate is expected to work on one of the following topics:

- Robotic manipulation using vision and tactile sensors in unstructured environments
- Developing algorithms that allow robots to manipulate objects cooperatively with humans using learning from demonstration and reinforcement learning techniques

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field
 - Experience in deep learning and other machine learning methods
 - Experience in the following is preferred for some topics: tactile sensing, manipulation, grasping, motion planning, real robots, or physics engines such as MuJoCo and Bullet
 - Good programming skills in either C++ or Python
 - Experience in Robot Operating System (ROS)
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In-Hand Manipulation Planning and Control (Job Number: P19INT-21)

This position focuses on developing planning and control algorithms for in-hand manipulation with multi-fingered robotic. The development will be conducted primarily in simulation, although hardware compatibility should be considered throughout the development.

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, mechanical engineering, or related field
 - Experience in robot kinematics/dynamics, motion planning, manipulation, and/or force control
 - Hands-on experience on deploying algorithms to real robot systems preferred
 - Excelling programming skills in C++ or Python
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Physical Human-Robot Interaction (Job Number: P19INT-22)

This title includes multiple positions that focus on formulating and developing algorithms as well as conducting user studies of teleoperated / autonomous physical human-robot interaction (pHRI). The candidate is expected to work on one or more of the following topics:

- Hardware and software integration
- Modeling and interaction design for pHRI
- Intention and emotional state estimation for pHRI
- Planning, preparation and execution of user studies

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, mechanical engineering, or related field
- Experience in robot kinematics/dynamics, force control, or human motion analysis
- Experience in setting up and executing real robot experiments using ROS
- Experience in setting up and executing user studies involving robot hardware
- Excellent programming skills in C++ or Python

Intention Estimation for Robot Teleoperation (Job Number: P19INT-23)

This project focuses on the development, implementation and testing of algorithms to model and infer intention of a human operator during object manipulation by tele-operated robot, to enhance human robot interaction performance using algorithms involving probabilistic modeling and machine learning. The candidate is expected to work on one or more of the following topics:

- Human behavior understanding from multi-modal data and a priori knowledge
- Robotic object manipulation recognition, planning, and optimization
- Human intention prediction in robot teleoperation environment
- Experimental design and evaluation of human-machine interaction performance

Qualifications:

- Ph.D. or highly qualified M.S. candidate in robotics, computer science, electrical engineering, or related field
 - Strong familiarity and research experience in probabilistic approach, computer vision, path planning, and control of robotic systems
 - Experience in setting up and executing real robot experiments using ROS and robot hardware
 - Excellent programming skills in Python and/or C++
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Monocular Visual SLAM for Autonomous Driving (Job Number: P19INT-24)

This position focuses on using monocular camera combined with other sensors to conduct map creation, developing efficient map data structure, long-term localization under drastic appearance changes, etc. The candidate is expected to develop robust software for real vehicles using a combination of well-established and novel research techniques.

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field
 - Prior research and development experience in SLAM is required. Must be familiar with the VSLAM pipeline and able to write working code.
 - Hands-on experience in one or more of the following: feature extraction, pose graph optimization, loop closure, 3D reconstruction, long-term localization, camera-LiDAR fusion.
 - Excellent programming skills in C++.
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Social Navigation (Job Number: P19INT-25)

This position will focus on social navigation. The intern will construct movement algorithms for robots in human populated environments that considers both classical metrics (such as safety and efficiency) and “social robotics” metrics (such as human proximity preferences, multifaceted human intent, and human flexibility). Building on recent work (game theory, adversarial reinforcement learning/Bayesian neural networks, optimization theory), the intern will define, train, and then online optimize these classical and contextual metrics for the “motion planning in crowds” problem.

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field
- Experience in machine learning (adversarial reinforcement learning/Bayesian neural networks, and stochastic processes such as Dirichlet and Gaussian processes), control theory, and optimization
- Experience training and testing on existing public datasets (ETH, UCY)

- Ability to assist in the collection of a new benchmark dataset for social navigation (to be used for validation, and, potentially, training of new algorithms)
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Interactive Decision Making (Job Number: P19INT-26)

This project focuses on the development of planning and control algorithms for interactive decision making. We will be expanding on our work on interactive decision making for merging and extending it to deadlock scenarios. We would like to continue this research to increase the robustness under different operating conditions. This is an opportunity for applied work in MPC, game theory, and safe RL.

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field
 - Strong familiarity and research experience in path planning, and control of robotic systems.
 - Highly proficient in software engineering using C++ and/or Python. algorithms)
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Path Planning for Visual SLAM (Job Number: P19INT-27)

This project looks at applying our existing work on curious decision making to a visual SLAM application

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related STEM field
 - Strong familiarity and research experience in SLAM, computer vision, planning, and robotics.
 - Highly proficient in software engineering using C++ and/or Python
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Behavior Understanding and Prediction (Job Number: P19INT-28)

The title includes multiple positions, which focus on developing computer vision and machine learning algorithms for analysis, prediction, and understanding of human behavior in various domains to support ongoing research on next generation intelligent mobility systems. The candidate is expected to work on one of the following topics:

- Behavior understanding and interaction modeling
- Trajectory prediction
- Uncertainty estimation and quantification
- Relational reasoning
- Causal inference
- Multimodal learning

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field
- Strong research experience in computer vision, machine learning, robotics
- Hands-on experience in one or more of the following: graph neural networks, graph convolutional networks, probabilistic neural networks, deep generative models (GAN/VAE), reinforcement learning
- Experience in open-source deep learning frameworks such as TensorFlow or PyTorch
- Excellent programming skills in Python

Human Pose and Action Recognition & Forecasting (Job Number: P19INT-29)

The title includes multiple positions, which focus on developing computer vision and machine learning algorithms for recognition and forecasting of human motion. The candidate is expected to work on one of the following topics:

- Action recognition and prediction using single- or multi-modal data
- Human motion (trajectory and pose) and intention prediction in indoor and outdoor environments
- Detecting and recognizing human-object interaction
- Creation of a benchmark human behavior dataset for various applications

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field
 - Strong research experience in computer vision and machine learning
 - Hands-on experience in one or more of the following: trajectory forecast, motion prediction, action and activity recognition, pose estimation/tracking, intention prediction
 - Experience in open-source deep learning frameworks such as TensorFlow or PyTorch preferred
 - Excellent programming skills in Python / C++ / Matlab
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Computer Vision and Machine Learning in Traffic Scenes (Job Number: P19INT-30)

The title includes multiple positions, which focus on developing computer vision and machine learning algorithms to capture the detailed semantics of 2D and/or 3D traffic scenes. The candidate is expected to work on one of the following topics:

- Capturing the semantics of visual scenes by explicit modeling of objects, their attributes, and relationships to other objects and the environment
- Higher level classification/recognition of dynamic traffic scenes including place, conditions, and spatial relationships using temporal event detection, action recognition, and localization
- Detection and understanding of unstructured events that impact navigation, such as disabled vehicles, construction zones, traffic accidents, etc.
- Multi-modal sensor fusion (cameras, LiDARs, and radars) for detection / classification with uncertainty
- Driver attention and risk perception modeling from video in urban traffic scenes.

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field
- Strong familiarity with computer vision and machine learning techniques pertaining to scene understanding, image classification, and object detection
- Hands-on experience in one or more of the following: probabilistic graphical models, scene graphs, spatio-temporal graphs, SLAM, sensor fusion, visual recognition, video classification, LiDAR processing
- Experience in open-source deep learning frameworks such as TensorFlow or PyTorch preferred
- Excellent programming skills in Python or C++
- Experience with Point Cloud Library (PCL), Robot Operating System (ROS), and GPU programming is preferred for some topics

Video-based Captioning in Traffic Scenes (Job Number: P19INT-31)

This title includes multiple positions, which focus on developing computer vision and machine learning algorithms to generate linguistic descriptions of traffic scene events that are important for development of advanced driver assistance systems. The candidate is expected to work on one of the following topics:

- Generating natural language description of unstructured traffic scene events that impact navigation (e.g. accidents, construction, road blockage) from video inputs
- Constructing a dataset (synthetic and/or real) to support activities in video-based captioning of traffic scene.

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field
 - Strong familiarity with computer vision and machine learning techniques pertaining to video captioning and retrieval
 - Familiarity with creating datasets for video captioning, including visual question and answering methods is preferred for one position.
 - Experience in open-source deep learning frameworks such as TensorFlow or PyTorch preferred
 - Excellent programming skills in Python or C++
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Data Management User Interface Development (Job Number: P19INT-32)

This position focuses on design and development of a web user interface for search and retrieval of recorded video, Lidar, and other vehicle sensor data obtained from an instrumented vehicle. The interface is part of a data management system that will be used to facilitate development of computer vision and machine learning algorithms that enable automated and advanced driver assistance systems. The candidate is expected to work on the following topics:

- Developing a search engine style web application for information retrieval and performing updates on Honda Research Institute Driving Datasets.
- Standardize data taxonomies across the datasets.

Qualifications:

- M.S. or highly qualified B.S. candidate in computer science, software engineering, or related field
- Experience with user interface design using tool HTML, jQuery, Bootstrap, etc.
- Strong familiarity with front end, backend technologies and RESTful web services.
- Experience with JavaScript development.
- Fluent with Node.js and Express.
- Fluent with SQL and NoSQL databases.
- Strong foundation in in data structures, algorithms, software design, API design and security.
- Excellent programming skills in JavaScript, Python

Explainable AI (Job Number: P19INT-33)

This project focuses on developing behavior cloning models using machine learning algorithms with emphasis on human-interpretable network. The project includes:

- Exploiting prior knowledge as constraints in data-driven graph networks to achieve explainability and performance guarantees.
- Advancing from static to dynamic relations in graph networks to achieve continuous representation and estimation.

The candidate is expected to work on improving the design of a pre-existing model, to perform thorough evaluation on real-world datasets, and to showcase comparative benefits of the developed system.

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field
 - Strong familiarity with computer vision and machine learning techniques pertaining to XAI
 - Experience in one or more of the following topics: Network attention, graph neural network, knowledge/scene graph, inverse reinforcement learning preferred
 - Experience in open-source deep learning frameworks such as TensorFlow or PyTorch preferred
 - Excellent programming skills in Python
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Computational Model for Social Human-Machine Interaction (Job Number: P19INT-34)

This project focuses on computational model for social human machine interaction in human supervisory control scenarios. The project involves design and development of interaction model using probabilistic models and optimization of the agent behavior using supervised and reinforcement learning algorithms.

Responsibilities:

- Modeling Behavior Dynamics for social human machine interaction
- Build behavior modeling framework to understand and predict interactions between human and machine.
- Develop more usable machine/deep learning tools for improve system performance and mobility safety

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, mathematics, statistics, psychology, cognitive science or human behavior related field
- Research experience in machine learning, behavioral research and human-computer interaction
- Excellent programming skills in either C++ or Python
- Experience in applied statistics i.e. probabilistic models and Bayesian models, machine/deep learning, reinforcement learning and human-in-the-loop online learning
- Experience in open-source deep learning frameworks such as TensorFlow or PyTorch preferred

Computational Model of Driver Situational Awareness (Job Number: P19INT-35)

This project focuses on developing a computational model to estimate driver situational awareness. The candidate is expected to achieve the following tasks:

- Model driver situational awareness using machine learning algorithms based on scene saliency and driver gaze
- Implement the algorithm on our driving simulator and conduct a user study

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, mathematics, statistics, psychology, cognitive science or human behavior related field
 - Research experience in machine learning, behavioral research and human-computer interaction
 - Excellent programming skills in either C++ or Python
 - Experience in open-source deep learning frameworks such as TensorFlow or PyTorch preferred
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Human Factors for Next Generation Mobility Interfaces (Job Number: P19INT-36)

This position offers the opportunity to design and conduct human-factors study for next generation mobility human-machine interfaces on our experimental simulator setups.

Responsibilities:

- Design and conduct the human-factors studies to evaluate our prototype Human Machine Interfaces (HMIs)
- Generate insights that both fuel ideation and evaluate designs
- Data analysis to compare human's behavior and perception of systems.
- Conduct research using a wide variety of quantitative methods, and interpret analysis through the lens of HMI, and social science

Qualifications:

- Ph.D. or highly qualified M.S. candidate in human behavior related field (human computer interaction, human factor engineering, cognitive science), psychology, or social science
 - Experience in human factors research including workload, attention, situation awareness, or trust
 - Hands-on experience in designing, implementing and evaluating Human Machine Interface (HMI) or Human Computer Interface (HCI)
 - Experience in hypothesis test, probabilistic models and survey data analyses
 - Experience in using driving simulator preferred
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Vision and Language (Job Number: P19INT-37)

This project focuses on developing vision and language algorithms to advance research in vision-language navigation. The project involves developing algorithms that interpret visually-grounded natural language instructions and conduct driving/in-house navigation tasks based on the input text.

Qualifications:

- Ph.D. or highly qualified M.S. candidate in computer science, electrical engineering, or related field
- Strong familiarity with computer vision, natural language processing and machine learning techniques pertaining to vision and language navigation

- Experience in open-source deep learning frameworks such as TensorFlow or PyTorch
 - Excellent programming skills in Python
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System Development for Next Generation Mobility Interfaces (Job Number: P19INT-38)

The intern will contribute to a project through the development of HMI prototypes and driving environments on our driving simulator using game engines. This is a part time intern position (2-3 days/week).

Qualifications:

- M.S. or highly qualified B.S. in Computer Science, Computer Engineering, Game Development, or related fields
- Experience in game engines (e.g., Unreal Engine 4, Unity), Nice to have an experience in UI prototyping/design tools (e.g., Adobe Xd, Android Studio) and video editing tools (e.g., Adobe Premiere) (please share a portfolio/links showcasing your projects related to game development)
- Excellent programming skills in C++ and C#