

# Vivek Sharma

## Curriculum Vitae

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## Work Experience



2019-Now

### Medical Imaging: CT to MRI scan.

Massachusetts General Hospital (MGH). Harvard Medical School (HMS). Position: Non-Employee PhD Student. Employer: Dr. Rajiv Gupta.



2019-Now

### ExpertMatcher: Automating ML Model Selection w/wo Privacy Concerns.

Camera Culture Group, MIT Media Lab, Massachusetts Institute of Technology (MIT). Position: Research Affiliate. Faculty Host: Prof. Ramesh Raskar.

2019-Now



### Climate E-Tool.

Machine Intelligence Lab at Boston Children Hospital. Harvard University, Medical School (HMS). Position: Research Affiliate & Collaborator. Project lead: Prof. Mauricio Santillana (HMS) and Sujata Saunik (IAS Officer India).

3/17-Now



### DFG Funded Project: PLUMCOT.

Institute for Anthropomatics and Robotics, CV:HCI Lab, Karlsruhe Institute of Technology (KIT). Position: Research Assistant/ PhD Candidate. Employer: Prof. Dr. Rainer Stiefelhofen.

6/18-06/18



### Research Visit.

University of Paris-Sud and LIMSI. Position: Visiting Researcher. Employer: Prof. Claude Barras, Asst. Prof. Camille Guinaudeau, Dr. Herve Bredin.

01/15-1/17



### EU Funded Project - ROVINA.

Department of Electrical Engineering (ESAT) - Center for Processing Speech and Images (PSI), KU Leuven. Position: Research Assistant. Employer: Prof. Luc Van Gool, KU Leuven/ETH Zürich

11/11-10/12



### Project: ViMuDat.

Visual Inspection Systems (SPR), Fraunhofer IOSB. Position: Research Associate. Employer: Prof. Dr. -Ing. Thomas Längle, Head of the Research Group.

08/11-10/12



### Project: CADaVISION (BMBF 01ISO9036B), [Link-to-PDF](#).

Institute of Process Control, Automation & Robotics, Karlsruhe Institute of Technology (KIT). Position: Guest Researcher. Employer: Prof. Dr. -Ing. Heinz Wörn, Dean of Computer Science.

## Education

03/17-Now



### PhD Thesis: Towards learning an effective image and video feature representation with convolutional networks, Project: PLUMCOT.

Computer Vision for Human-Computer Interaction Lab (CV:HCI), Karlsruhe Institute of Technology (KIT). Supervisor: Prof. Dr. -Ing. Rainer Stiefelhofen.


09/12-09/14



### Color in Informatics and Media Technology (CIMET): Master of Science (M.Sc.),

I-Sem: University Jean Monnet, FRANCE. M.Sc. in "Optics, Image, Vision". II-Sem: University of Granada, SPAIN. M.Sc. in "Informatics & Media Technology". III-Sem: Norwegian University of Science and Technology, NORWAY. M.Sc. in "Applied Computer Science". IV-Sem: Karlsruhe Institute of Technology, GERMANY. "Master Thesis".


CGPA - 7.8/10 with Distinction Marks (Honours), ECTS - 120.

08/07-07/11  **Computer Science & Engineering: Bachelor of Technology (B.Tech.),** *B.K. Birla Institute of Engineering and Technology (BKBIET),* INDIA.  
CGPA - 7.73/10 with First Division.

## Academic Thesis & Project

### Master

01/14-06/14  **Thesis: Training and Evaluation of a Framework for Pixel-wise Object Class Segmentation based on Synthetic Depth Data,** Project (KIT): **AMIKA.**

 Karlsruhe Institute of Technology (KIT), Norwegian University of Science and Technology (NTNU), University of Oslo (UiO) and Oslo University Hospital HF. Supervisor: Prof. Dr. -Ing. Heinz Wörn (KIT) and Assoc. Prof. Dr. Şule Yildirim Yayilgan (NTNU) and Assoc. Prof. Dr. Ole Jakob Elle (UiO & Oslo University Hospital HF).




11/13-12/13  **Project: Hyperspectral Imaging Workflow & Encoding Standards,** *Link-to-PDF.*


Norwegian Colour and Visual Computing Laboratory, and NTNU. Position: Student Research Assistant. Supervisor: Prof. Jon Yngve Hardeberg

8/13-12/13  **Industrial Project: Waste sorting by Intelligent Machine Vision,** *Link-to-PDF.*


University of Eastern Finland (UEF), Norwegian University of Science and Technology (NTNU), and ZenRobotics (Finland). Supervisor: Prof. Markku Hauta-Kasari & Prof. Jon Yngve Hardeberg.

8/13-11/13  **Project: Scene Understanding using Conditional Random Fields for Safe Human Robot Collaboration ,** *Link-to-PDF.*

Norwegian Colour and Visual Computing Laboratory, UiO, and NTNU. Position: Student Research Assistant. Supervisor: Prof. Dr. Faouzi Alaya Cheikh

6/13-8/13  **Internship: Material identification in different weather conditions for unsupervised traffic control systems,** *Link-to-PDF.*

Color Imaging Lab, University of Granada (UGR), and Tecnalia Robotiker (Bilbao, Spain). Supervisor: Prof. Eva M. Valero (UGR).

2/13-6/13  **Project: 3D cloud maps,** *Link-to-PDF.*

Andalusian Center for Environmental Research (CEAMA), University of Granada (UGR), NASA AERONET (AERosol Robotic NETwork). Position: Student Research Assistant. Supervisor: Prof. Lucas Alados Arboledas, Head of the Atmospheric Physics Institute.

### Bachelor

01/11-06/11  **Thesis: Gesture Recognition & Reproduction.**

B.K. Birla Institute of Engineering and Technology. Supervisor: Assoc. Prof. Lovendra Solanki, Dean of Electrical & Electronics Engineering Department.

## Awards

2019 **ICCV Student Award.**

2019 **Best Paper Award @ FG'19.**

Vivek Sharma, Makarand Tapaswi, M. Saquib Sarfraz, and Rainer Stiefelhagen. Self-Supervised Learning of Face Representations for Video Face Clustering. *In IEEE Automatic Face and Gesture Recognition (FG).* <http://fg2019.org/awards>

2019 **Karlsruhe House of Young Scientist (KHYS) Scholarship.**

Awarded an amount of 7,250 Euros for my visit to Massachusetts Institute of Technology.

2018 **CVPR Student Volunteering Award.**

2017 **ICCV Student Volunteering Award (declined).**

2013 **Appreciation.**

Overall topper of the 1st semester for the Master courses taken at the University of Jean Monnet.

- 2012 **European Commission Scholarship.**  
Awarded an amount of 48,000 Euros for my Master program, selected among 500 candidates.
- 2011 **Appreciation.**  
Among the top 10% out of 65 students graduated B.Tech in Computer Science, BKBIET.

## Conference and Workshops Attended/Organized

### Publications: Conferences & Workshops

#### – Journals

- 2019 **Vivek Sharma**, Makarand Tapaswi, M. Saquib Sarfraz, and Rainer Stiefelha-  
T-BIOM Clustering with Self-Supervised Representation Learning. *IEEE Transactions on Biometrics, Behavior, and Identity Science (T-BIOM)*.
- 2018 **Vivek Sharma** and Sule Yildirim-Yayilgan. Real-time Holistic Scene Understanding using  
IJRR Single Depth Images for Safe Human-Robot Collaboration. Under Review, minor corrections.
- 2017 **Vivek Sharma**, Jon Yngve Hardeberg, Sony George. RGB-NIR Image Enhancement by  
JIST-First Fusing Bilateral and Weighted Least Squares Filters. *In Journal for Imaging, Science & Technology (JIST-First) and Color and Imaging Conference (CIC)*, **Oral**.

#### – Conferences & Workshops

- 2020 **Vivek Sharma**, Makarand Tapaswi, M. Saquib Sarfraz, and Rainer Stiefelha-  
FG based Contrastive Learning for Improving Face Representations. *In IEEE Automatic Face and Gesture Recognition (FG)*.
- 2019 **Vivek Sharma\***, Ali Diba\*, Mohsen Fayyaz\*, Manohar Paluri, Juergen Gall, Rainer Stiefelha-  
arXiv-Link gen, and Luc Van Gool. Holistic Large Scale Video Understanding. *CoRR abs/1904.11451*.
- 2019 **Vivek Sharma**, Praneeth Vepakomma, Tristan Swedish, Ken Chang, Jayashree Kalpathy-  
NeurIPS Cramer, and Ramesh Raskar. ExpertMatcher: Automating ML Model Selection for Users in Resource Constrained Countries. *In NeurIPS Workshop on Machine learning for the Developing World (ML4D)*, Poster.
- 2019 **Vivek Sharma**, Praneeth Vepakomma, Tristan Swedish, Ken Chang, Jayashree Kalpathy-  
NeurIPS Cramer, and Ramesh Raskar. ExpertMatcher: Automating ML Model Selection for Clients using Hidden Representations. *In NeurIPS Workshop on Robust AI in Financial Services: Data, Fairness, Explainability, Trustworthiness, and Privacy*, **Oral**.
- 2019 **Vivek Sharma\***, Ali Diba\*, Luc Van Gool, and Rainer Stiefelha-  
ICCV Action and Motion Network. *In IEEE ICCV*, **Oral**.
- 2019 **Vivek Sharma**, Makarand Tapaswi, and Rainer Stiefelha-  
ICCV Encoding for Video Ordering. *In ICCV Workshop on Holistic Video Understanding (HVU)*, **Oral**.
- 2019 Veith Röthlingshöfer\*, **Vivek Sharma\*** and Rainer Stiefelha-  
ACMMM Grouping on Graphs. *In ACMMM*, **Spotlight**.
- 2019 **Vivek Sharma**, Makarand Tapaswi, M. Saquib Sarfraz, and Rainer Stiefelha-  
FG Supervised Learning of Face Representations for Video Face Clustering. *In IEEE Automatic Face and Gesture Recognition (FG)*, **Oral. Best Paper Award**.
- 2019 M. Saquib Sarfraz, **Vivek Sharma**, and Rainer Stiefelha-  
CVPR Clustering Using First Neighbor Relations. *In IEEE CVPR*, **Oral**.
- 2019 **Vivek Sharma\***, Ali Diba\*, Rainer Stiefelha-  
CVPR Discovery by Generative Adversarial & Ranking Networks. *In IEEE CVPR Workshop on Compact and Efficient Feature Representation and Learning in Computer Vision (CEFRL)*, **Oral**.

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\* contributed equally to the work, and not in alphabetical order.

- 2018 **Vivek Sharma\***, Concong Wang\*, Yu Fan, Faouzi Alaya Cheikh, Azeddine Beghdadi, Ole Jacob Elle, and Rainer Stiefelhagen. Can Image Enhancement be Beneficial to Find Smoke Images in Laparoscopic Surgery? *Color and Imaging Conference (CIC)*, **Oral**.
- 2018 Ali Diba, Mohsen Fayyaz, **Vivek Sharma**, Amir Hossein Karami, Rahman Yousefzadeh, ECCV Juergen Gall, Luc Van Gool. Spatio-Temporal Channel Correlation Networks for Action Classification. *European Conference on Computer Vision (ECCV)*, *Poster*.
- 2018 **Vivek Sharma**, Ali Diba, Davy Neven, Michael S. Brown, Luc Van Gool, Rainer Stiefelhagen. CVPR Classification Driven Dynamic Image Enhancement. *In IEEE CVPR*, *Poster*.
- 2018 Ali Diba, Mohsen Fayyaz, **Vivek Sharma**, Amir Hossein Karami, Mohammad Mahdi Arzani, CVPR Rahman Yousefzadeh, Luc Van Gool. Temporal 3D ConvNets using Temporal Transition Layer. *In IEEE CVPR Workshop: Brave New Ideas for Video Understanding*, **Oral**.
- 2017 **Vivek Sharma\***, Ali Diba\*, Luc Van Gool. Deep Temporal Linear Encoding Networks. *In CVPR IEEE CVPR*, *Poster*.
- 2017 Ali Diba, **Vivek Sharma**, Ali Pazandeh, Hamed Pirsiavash, Luc Van Gool. Weakly Supervised CVPR Cascaded Convolutional Networks. *In IEEE CVPR*, *Poster*.
- 2017 **Vivek Sharma**, Saquib M. Sarfraz, Rainer Stiefelhagen. A Simple and Effective Technique for CVPR Face Clustering in TV Series. *In IEEE CVPR Workshop: Brave New Motion Representations*, *Poster*.
- 2016 **Vivek Sharma**, Ali Diba, Tinne Tuytelaars, Luc Van Gool. Hyperspectral CNN for Image Tech. Report Classification & Band Selection, with Application to Face Recognition.
- 2016 **Vivek Sharma**, Luc Van Gool. Does V-NIR based Image Enhancement Come with Better arXiv-Link Features? *CoRR abs/1608.06521*.
- 2016 **Vivek Sharma**, Jose Antonio Oramas Mogrovejo. A Novel Approach for an Interactive Tech. Report Hyperspectral Image Segmentation.
- 2016 **Vivek Sharma**, Luc Van Gool. Image-level Classification in Hyperspectral Images using arXiv-Link Feature Descriptors, with Application to Face Recognition. *CoRR abs/1605.03428*.
- 2016 **Vivek Sharma**, Şule Yildirim-Yayilgan, Luc Van Gool. Low-Cost Scene Modeling using a RO-MAN Density Function Improves Segmentation Performance. *In IEEE RO-MAN*, **Oral**.
- 2015 **Vivek Sharma**, Şule Yildirim-Yayilgan, Frank Dittrich, Luc Van Gool. Efficient Real-Time ICML Pixelwise Object Class Labeling for Safe Human-Robot Collaboration in Industrial Domain. *In ICML Workshop: Machine Learning for Interactive Systems*, **Oral**.
- 2015 **Vivek Sharma**, Frank Dittrich, Şule Yildirim-Yayilgan, Luc Van Gool. Improving Human CVPR Pose Recognition Accuracy using CRF modeling. *In IEEE CVPR Workshops*, *Poster*.
- 2015 **Vivek Sharma**, Frank Dittrich, Şule Yildirim-Yayilgan, Ali Shariq Imran, Heinz Wörn. How HCI to tune a Random Forest for Real-Time Segmentation in Safe Human-Robot Collaboration? *In International Conference on HCI*, *Poster*.
- 2015 **Vivek Sharma**, Frank Dittrich, Şule Yildirim-Yayilgan, Heinz Wörn. How does Energy EMMCVPR Minimization Improve Recognizing Human Poses for Safe Human-Robot Collaboration? *In EMMCVPR*, *Poster*.
- 2014 Frank Dittrich, **Vivek Sharma**, Heinz Wörn, Şule Yildirim-Yayilgan. Pixelwise Object Class ICNSC Segmentation based on Synthetic Data using an Optimized Training Strategy. *In IEEE ICNSC*, **Oral**.
- 2012 **Vivek Sharma**. CADaVISION: A Gesture Recognition Simulation. *Institute of Process Tech. Report Control, Automation & Robotics, Karlsruhe Institute of Technology, Germany*.
- 2012 **Vivek Sharma**, Dario Udovicic, Stevan Dordevic, Antonio Lucio. Sensor Fusion for Pedes- Tech. Report trian Tracking. *Institute of Industrial Information Technology (IIIT), Karlsruhe Institute of Technology, Germany*.

## Invited Talks

- 2019
  - Recent Advances in unsupervised face representation learning and video understanding. Hosted by Ser-Nam Lim and Manohar Paluri. *Facebook*, Boston, USA.
  - Recent Advances in Image and Video Representation Learning. Hosted by Patrick Buehler. *Microsoft*, Boston, USA.
  - Unsupervised Representation Learning. *Harvard Medical School, Harvard University*, Cambridge, USA.
  - Recent Advances in Video Understanding. Hosted by Alan Sullivan. *Mitsubishi Electric Research Labs (MERL)*, Boston, USA.
  - Recent Advances in Video Understanding. Hosted by Hilde Kuehne. *MIT-IBM Watson Lab*, Boston, USA.
  - Temporal 3D ConvNets. *In Advances in Imaging Course - MIT Professional Education*, Boston, USA.
  - Self-supervised Face Representation Learning. Hosted by Samson Timoner. *ISM Connect*, Boston, USA.
  - Temporal 3D ConvNets using Temporal Transition Layer. *In IEEE Computer Vision and Pattern Recognition (CVPR) Workshop on Compact and Efficient Feature Representation and Learning in Computer Vision*, Los Angeles, USA.
  - Dynamic Image Enhancement. *Camera Culture Group, Massachusetts Institute of Technology*, Boston, USA.
  - Self-Supervised Learning of Face Representations for Video Face Clustering. *In IEEE Automatic Face and Gesture Recognition*, Lille, France.
  - Role of Multispectral Image Fusion for Vision Applications. *OCM SpectroNet Collaboration Conference 2019*, Karlsruhe, Germany.
- 2018
  - Robust and effective feature representation for robotic and vision applications. Hosted by Anton Milan. *Amazon Research*, Berlin, Germany.
  - Temporal 3D ConvNets using Temporal Transition Layer. *In IEEE Computer Vision and Pattern Recognition (CVPR) Workshop on Brave New Ideas for Video Understanding*, Salt Lake, Utah, USA.
  - Unsupervised Feature Learning for Person Identification. Hosted by Herve Bredin, Camille Guinaudeau, and Claude Barras. *University of Paris-Sud and LIMSI*, Paris, France.
  - The Choice is Yours: To Enhance or not To Enhance. Hosted by Florent Perronnin and Naila Murray. *NAVER Labs (previously Xerox R&D)*, Grenoble, France.
- 2017
  - Multi/Hyper-Spectral Imaging Applications in Computer Vision. *3rd Global Summit and Expo on Multimedia & Applications*, Lisbon, Portugal.
- 2016
  - Pose Estimation & Recognition. Hosted by Daniel Veithen. *Sony Depthsensing Solutions (previously SoftKinetic)*, Brussels, Belgium.
- 2015
  - Efficient Real-Time Pixelwise Object Class Labeling for Safe Human-Robot Collaboration in Industrial Domain. *In International Conference on Machine Learning (ICML) Workshop on Machine Learning for Interactive Systems (MLIS)*, Lille, France.
  - Multi/Hyper-Spectral Imaging Applications. *SpectroNet International Collaboration Forum*, Jena, Germany.
  - Efficient Real-Time Pixelwise Object Class Labeling for Safe Human-Robot Collaboration in Industrial Domain. *KU Leuven*, Leuven, Belgium.
- 2014
  - Scene Understanding using Conditional Random Fields for Safe Human Robot Collaboration. Hosted by Ole Jakob Elle. *University of Oslo and Oslo University Hospital*, Ullevål, Norway.
  - Pixelwise Object Class Segmentation based on Synthetic Data using an Optimized Training Strategy. *In IEEE International Conference on Networks & Soft Computing*, Hyderabad, India.

2010 Radio Frequency & Identification. *Institute of Electronics & Telecommunication Engineers (IETE), BKBIET, India.*

#### Reviewer

- **Conference.** CVPR ('18,'19,'20), ICCV ('19), ECCV ('18,'20), ICPR ('18), FG ('17,'18,'19,'20), GRSL ('16, '17), TBIOM ('19)
- **Workshop.** ICCV: Multi-modal Video Analysis and Moments in Time Challenge ('19), NeurIPS: AI for Social Good ('19)

#### Program Committee

- **Conference.** AAAI ('20)
- **Workshop.** CVPR: Brave New Motion Representations ('17), ICCV: Large Scale Holistic Video Understanding ('19), ECCV: Large Scale Holistic Video Understanding ('20)
- **Tutorial.** CVPR: Large Scale Holistic Video Understanding ('20)

#### Mentor

- **Workshop.** ICLR: Tackling Climate Change with Machine Learning ('20)

#### Conferences/Workshops Organized

09/20 **ECCV Workshop on Large Scale Holistic Video Understanding.**

ECCV Proposal submitted. To be held at Glasgow, UK. Organizing with Ali Diba (KU Leuven, Sensifai), Mohsen Fayyaz (Uni. Bonn), Manohar Paluri (Facebook AI Research), Ehsan Adeli (Stanford University), Juergen Gall (Uni. Bonn), Rainer Stiefelhausen (KIT) and Luc Van Gool (ETH Zurich, KU Leuven)

06/20 **CVPR Tutorial on Large Scale Holistic Video Understanding.**

CVPR Proposal submitted. To be held at Seattle, USA. Organizing with Ali Diba (KU Leuven, Sensifai), Mohsen Fayyaz (Uni. Bonn), Manohar Paluri (Facebook AI Research), Juergen Gall (Uni. Bonn), Rainer Stiefelhausen (KIT) and Luc Van Gool (ETH Zurich, KU Leuven)

01/20 **MIT India Initiative - Design, Technology & Social Innovation Workshop.**



Held at Mumbai, India. Organizing with 30+ MIT and Harvard students

10/19 **ICCV Workshop on Large Scale Holistic Video Understanding.**



Held at Seoul, Korea. Organizing with Ali Diba (KU Leuven, Sensifai), Mohsen Fayyaz (Uni. Bonn), Manohar Paluri (Facebook AI Research), Juergen Gall (Uni. Bonn), Rainer Stiefelhausen (KIT) and Luc Van Gool (ETH Zurich, KU Leuven)

7/19 **Advances in Imaging Course - MIT Professional Education.**



Lead Instructor: Ramesh Raskar. Helped with organizing hands-on experiments session on computer vision and deep learning. Held at MIT, Boston, USA.

08/02/16 **Annual Symposium in Optics.**

OSA SPIE SPIE/OSA KU Leuven Student Chapter to be held on 8-9th Feb. 2016 in Leuven.

16/03/12 **IONS-Germany.**

OSA SPIE Under the OSA KIT CHAPTER Student Branch OSKAR.

5/09/10 **Green Earth.**

◆IEEE Under the IEEE BKBIET CHAPTER.

15/03/10 **Talk on Chandrayan II (Space Vehicle Flight & Launch).**

◆IEEE Under the IEEE BKBIET CHAPTER Student Branch (Region 10).

#### Grants

10/19-10/20 **Research contract, NAVER Labs Europe.**

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## Member of Organizations

- 01/15-Now **Student Member**, CVF, Member of Computer Vision Foundation.  
07/15-1/17 **Representated KU Leuven**, SpectroNet Cross-clustering Collaboration Forum.  
03/15-09/16 **Vice-President**, SPIE, OSA, KU Leuven Chapter.  
02/14-09/14 **Student Member**, TEKNA, NTNU Chapter.  
11/11-10/14 **Technical Leader**, OSKAR(Optics Students Karlsruhe) KIT Chapter OSA, SPIE.  
03/10-06/11 **Secretary**, IEEE BKBIET CHAPTER.  
06/08-06/11 **Co-Founder, President**, TECHNORATS, TECHNICAL CLUB, BKBIET.

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## Languages

|           |                              |                                     |
|-----------|------------------------------|-------------------------------------|
| English   | <b>Advanced</b>              |                                     |
| German    | <b>Intermediate Level B1</b> | <i>Conversationally fluent</i>      |
| Norwegian | <b>Basic</b>                 | <i>Basic words and phrases only</i> |

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## Letter of References

|            |  |                    |
|------------|--|--------------------|
| NTNU       | <b>Assoc. Prof. Dr. Şule Yildirim-Yayilgan</b> | <i>Link-to-PDF</i> |
| Fraunhofer | <b>Prof. Dr. -Ing. Thomas Längle</b>           | <i>Link-to-PDF</i> |
| KIT        | <b>Prof. Dr. -Ing. Heinz Wörn</b>              | <i>Link-to-PDF</i> |
| BKBIET     | <b>Assoc. Prof. Lovendra Solanki</b>           | <i>Link-to-PDF</i> |
| BKBIET     | <b>Assoc. Prof. Shridhar B. Dandin</b>         | <i>Link-to-PDF</i> |