

# Subarna Tripathi

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## Summary:

Alumna of UC San Diego (PhD) and IIT Delhi (MS) leading *Visual Algorithms Research* team at Intel Labs to be at the forefront of long-form video and multimodal foundation model research with an emphasis on gen AI for video. 15+ years of industry experience as a Research Scientist with a portfolio of [publications](#) (60+) at top-tier CV/ML conferences and creating open-source tools (collectively 1000+ stars, 140+ forks) with compelling applications for client and edge customers.

## Industry Work Experiences (since 2005)

### [Intel \(2018 – current\) - Principal Engineer, AI Research \(Intel Labs\)](#)

Led *Visual Algorithms Team* with 5 direct reports and 5 dotted for Video gen AI research and applications.

Currently leading a cross-functional initiative to develop gen AI for videos including (i) a controllable video generation and editing pipeline, (ii) multimodal 3D generation and (iii) enabling interaction with offline and streaming videos with LLMs.

### Training-Free Enhancements for Multimodal-LLMs:

- Developed a *training-free flexible* pipeline, VideoNarrator, for video search and summarization utilizing multimodal LLMs (**MLLMs**) and vision-language models (**VLMs**) in a modular fashion by providing functionalities of caption generation, context provider & caption refiner and caption verifier.
- Achieved 4–9% accuracy improvements across top-performing MLLMs including Phi-4, InternVL, Qwen, Molmo, miniCPM, and VideoLLaVA.
- Core technology deployed in Intel's open-source tool: [video-search-and-summarization](#), and detailed in this [paper](#).

### Multimodal-LLM Enhancements:

- Leading algorithmic innovations to advance the capabilities of video-LLMs with parameter-efficient finetuning (PEFT).
- Developed GO-Tokenizer, an object-level tokenization method for encoding compact object level information on-the-fly in a plug-and-play fashion to improve temporal comprehension capability of existing video-LLMs.
- Designing reference-free evaluation metrics for video captioning with factual analysis — fully local and independent of cloud-based LLM APIs.

### Video and Multimodal Generation:

- Driving algorithmic advancements to enhance the capabilities of World Models (e.g., COSMOS) and diffusion-based video generation models (e.g., Wan, HunyuanVideo, LTX Video, VACE) for zero-day deployment.
- Leading a cross-organizational effort for novel control mechanisms for user-friendly video generation and editing framework.
- Focusing on novel evaluation metrics for motion consistency for video generation models.

### Video Understanding Research:

- Designed efficient multimodal reasoning systems with spatio-temporal graphs and sparse transformers for 10+ video understanding applications, supporting 10× context coverage with 1/10th memory and compute overhead wrt. dense Transformers.
- Delivered state-of-the-art or competitive performance across applications including video Q&A, multimodal retrieval, scene graph generation, audio-visual diarization, action localization, video highlights detection, and dense captioning.
- Contributed to **benchmark-winning solutions** for active speaker detection and [fine-grained key-step](#) recognition.
- Led [open-sourcing](#) of PyTorch-based tools to support the video understanding research community.

### Intel Fab Automation:

- Designed multimodal reasoning systems for fine-grained action forecasting to enable human-AI collaboration for task-assistance workflow in Intel Fab environments, achieving a 14% accuracy improvement.
- Integrated video intelligence for task assistance workflows adopted into Intel's LLM framework leveraging **multimodal RAG** and **agentic architectures**.

### [Intel-Academia Engagements in AI](#)

- AI Academic Strategy and Technical Leadership - Acting as the primary contact for managing global AI-themed academic investments, overseeing project portfolios, identifying and addressing gaps, and facilitating technology transfers.
- Center Lead Liaison for JUMP2.0 Center, [COCOSYS](#): Coordinating with 10+ Intel liaisons on multi-year projects involving 21 professors across multiple universities, defining mutually beneficial projects and streamlining technology transfer processes.
- Chair, AI Strategic Research Sector: Leading global AI academic investments for single principal investigator (PI) funding, driving strategic research initiatives.

### [Qualcomm - Engineering Intern \(Fall of 2016\)](#)

Created and trained a [low-complexity](#) object-detection model from scratch using TensorFlow-Slim that achieved comparative accuracy with 12X smaller model size and 16X efficient in memory-BW compared to the existing state-of-the-art models.

## Google - Research Intern (Summer of 2016)

Designed and implemented algorithms with TensorFlow-Slim for person segmentation with human pose which was later integrated in Google Pixel's *Portrait Mode* feature in Camera SW.

## Microsoft Research - Research Intern (Summer of 2015)

Developed algorithms and created prototypes for [self-calibrating eye-gaze tracking](#) for head mounted virtual reality systems. The associated publication won the best paper award in WACV'2017 and the solution was integrated in MSR's VR headset.

## STMicroelectronics Ltd - Technical Leader (2006-2012)

Led the design, development, and integration of advanced features for a set-top box System-on-Chip (SoC) that had a global distribution of ~85 million units in 2012. Engineered and implemented innovative algorithms (summarized below) in C and C++, authoring ~10,000 lines of high-performance code to drive system efficiency and feature innovation.

### Stereo video (MVC):

- Developed novel algorithms (C and C++) for 2D to stereo video generation. Implemented H.264 MVC decoder and created ST's proprietary MVC video encoder that was deployed in ST's STB SOC.

### Scalable video coding (SVC):

- Designed and implemented novel algorithms for object tracking and enabled object-based SVC i.e. scalable video coding for ST's STB SOC.

### Video compression:

- Developed novel algorithms for improving video encoding, transcoding, CBR-VBR rate controller algorithms for video standards such as MPEG-2, H.264 and VC1 for ST's STB SOC.

## Interra Systems - Member of Technical Staff (2005-2006)

Single-handedly designed and implemented TraceViewer from scratch, significantly enhancing analyzers for MP4 and 3GPP files in [VEGA](#), a vital industry tool adopted by organizations involved in video processing, encoding, and streaming media services.

## Education:

Ph.D. Electrical Engineering, UC San Diego, USA

2013-2018

M.S. Electrical Engineering, IIT Delhi, India

2007-2011

B.S. Computer Science, WBUT, West Bengal, India

2001-2005

## Selected Publications & Patents

60+ peer-reviewed publications, 8 [patents](#), 3100+ citations, h-index:24, i10-index:33 ([Google Scholar](#))

### **Publications at CV/ML conferences in last 5 years:**

20+ papers on video understanding and structured representation learning. First paper on spatio-temporal graphs for long-form video understanding at ECCV'22, follow up won several [benchmarks](#).

**TDS [blog series](#)** on video representation learning: community building in long-form video representation learning.

## Professional Membership, Mentoring

Technical Advisory Board (TAB) in SRC [GRC AIHW](#)

2023 – current

**Thesis** committee member

2021 – current

PhD students at University of Colorado Boulder and UC Santa Cruz, MS students at Indian Institute of Science and University of Warwick and undergraduate students at WBUT

**Mentor** at UCSD ECE Alumni Mentorship Prog

2021 – current

**Mentoring** 10+ early-career engineers at Intel

2022 – current

**Mentoring** 15+ undergrad and grad students

2021 – current

Mentored a **startup**, [BitHuman](#)

2024

Women in Computer Vision (**WICV**) Mentorship (Elevating, advising, and connecting women to excel)

2020 – current

## Selected Honors & Awards

**Divisional Recognition Awards (8)** at Intel between

2022 – 2025

**Select URM Alumni** at [MICS](#) UC San Diego

2020

**Best Paper Award**

2017

IEEE Winter Conf. on Application of Computer Vision (WACV)

**Invited talk** at IEEE Computer Society San Diego chapter

2025

**Guest Lecturer** – UC San Diego and U. of Catania

2022 – 2025

**GHC travel Scholarship** – Anita Borg Institute

2016

Annual **National Scholarship of Merit**, India (0.1% acceptance rate out of 500,000 applicants)

1999, 2001

## Selected Leadership, Services & Community

7 open-sourced releases (1000+ stars, 142+ forks), 45 talks, 10 press articles

Reviewer: CVPR, ICCV, ECCV, ICML, ICLR, NeurIPS, WACV

Area chair / organizer: CVPR, ICML, NeurIPS, ICCV

Volunteering: For public school students to excel at Mathematics.