

**Nicola Pezzotti**

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**Computer science and  
programming skills**

C++  
Algorithmics  
Qt  
OpenGL  
GPGPU  
Arduino  
JavaScript  
Python  
Deep Learning  
Linux Development  
Windows Development

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Gagelboschplein 535  
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**Date of birth**

17/06/1986

**Nationality**

Italian

**Languages**

Italian  
English

**References**

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# Nicola Pezzotti

**About Me** I was 13 years old when I started coding and I could never stop. I enjoy writing code that is scalable and solves real-world problems.

## Professional experience

### PhD Student, Delft University of Technology, The Netherlands

September 2014 - December 2018 (expected)

My research consists in the development of scalable manifold-learning algorithms for the analysis of extremely large high-dimensional data, such as medical datasets, social-networks and deep neural networks. My algorithms and systems were presented in the most important visual analytics venues and are used by medical researchers for the analysis of real-world data. Thanks to the Hierarchical Stochastic Neighbor Embedding (HSNE) algorithm that I developed, we were able to identify previously unknown immune-system cell types. This result was achieved by scaling up the number of cells that could be analyzed with a manifold-learning algorithm from a few thousands to several millions. HSNE is also the cornerstone for DeepEyes, a system for the visual analysis of deep neural networks during training that I developed. My algorithms are implemented in a C++ library that will be released later this year.

### Visiting PhD Student, INRIA Project Team AVIZ, France

April 2017 - June 2017

### Research & Development Engineer, Open Technologies S.R.L, Italy

July 2011 - August 2014

I was responsible of the development of the high-end real-time scanner *Insight3* I optimized the algorithms developed during my Research Fellowship and developed several Arduino-based systems for the on-board control of *Insight3*. Furthermore, I contributed to the development of the computational-geometry module of the Open Technologies S.R.L. proprietary library and I was in charge of the control versioning and the release of the company's main software.

### Research Fellow, University of Brescia, Italy

September 2011 - August 2012

I developed proprietary algorithms for the real-time computation of implicit surfaces on the GPU. These algorithms are designed to work with off-the-shelf and real-time scanning devices like the Microsoft Kinect and the PrimeSense Carmine and Capri. Furthermore, I devised a proprietary passive stereo system that led to the development of the *Insight3* high-quality real-time scanner. Due to the strict real-time requirements all the developed algorithms were implemented in C++, CUDA and Thrust.

## Awards

### Silver Medal, Italian Olympiad in Informatics

March 2005

Italian selection for the International Olympiad in Informatics (IOI).

## Education

### MSc in Software Engineering, University of Brescia, Italy

2009-2011

For my master thesis I worked on the development of fast and automatic tools for the alignment of 3D data such as point clouds, meshes and range images. This work was done in collaboration with the company Open Technologies S.R.L.

I graduated with a final grade of 110/110.

### BSc in Information Engineering, University of Brescia, Italy

2005-2009

For my bachelor thesis I developed a library for interprocess communication between real-time applications working in Linux-Xenomai and other Linux applications. This work was done in collaboration with the company G2L S.R.L.

## Personal interests

Long-distance running, cycling, reading, gaming, coding competitions, traveling.

## **Publications**

### **Featured Publications**

#### **Hierarchical Stochastic Neighbor Embedding**

N. Pezzotti, T. Höllt, B. Lelieveldt, E. Eisemann, A. Vilanova  
*Computer Graphics Forum, Proceedings of EuroVIS 2016*

#### **DeepEyes: Progressive Visual Analytics for Designing Deep Neural Networks**

N. Pezzotti, T. Höllt, J. van Gemert, B. Lelieveldt, E. Eisemann, A. Vilanova  
*Transaction on Visualization and Computer Graphics, Proc. of IEEE VIS 2017*

#### **Approximated and User Steerable tSNE for Progressive Visual Analytics**

N. Pezzotti, B. Lelieveldt, L. van der Maaten, T. Höllt, E. Eisemann, A. Vilanova  
*Transaction on Visualization and Computer Graphics, Presented at IEEE VIS 2016*

#### **Interactive Visual Analysis of Mass Cytometry Data by Hierarchical Stochastic Neighbor Embedding Reveals Rare Cell Types**

V. van Unen, T. Höllt, N. Pezzotti et al.  
*to appear in Nature Communications*

### **Other Publications**

#### **CyteGuide: Visual Guidance for Hierarchical Single-Cell Analysis**

T. Höllt, N. Pezzotti, V. van Unen, F. Koning, B. Lelieveldt, A. Vilanova  
*Transaction on Visualization and Computer Graphics, Proc. of IEEE VIS 2017*

#### **BrainScope: Interactive Visual Exploration of the Spatial and Temporal Human Brain Transcriptome**

S. Huisman, B. van Lew, A. Mahfouz, N. Pezzotti, T. Höllt, L. Michielsen,  
A. Vilanova, M. JT Reinders, B. Lelieveldt  
*Nucleic Acids Research 2017*

#### **Employing Visual Analytics to Aid the Design of White Matter Hyperintensity Classifiers**

R. Raidou, H. Kuijf, N. Sepasian, N. Pezzotti, W. Bouvy, M. Breeuwer, A. Vilanova  
*International Conference on Medical Image Computing and Computer-Assisted Intervention 2016*

#### **Cytosplore: Interactive Immune Cell Phenotyping for Large Single-Cell Datasets**

T. Höllt, N. Pezzotti, V. van Unen, F. Koning,  
E. Eisemann, B. Lelieveldt, A. Vilanova  
*Computer Graphics Forum, Proceedings of EuroVIS 2016*

#### **Poisson-Driven Seamless Completion of Triangular Meshes**

M. Centin, N. Pezzotti, A. Signoroni  
*Computer Aided Geometric Design 2015*

#### **On-the-Fly Automatic Alignment and Global Registration of Free-Path Collected 3D Scans**

F. Bonarrigo, N. Pezzotti, A. Signoroni  
*Digital Heritage International Congress 2013*

#### **Boosting the Computational Performance of Feature-Based Multiple 3D Scan Alignment by IAT-k-Means Clustering**

N. Pezzotti, F. Bonarrigo, A. Signoroni  
*3D Imaging, Modeling, Processing, Visualization and Transmission 2012*