NOKIA Bell Labs

Inventing the Future X Network

Creation of Bell Labs
The engineering departments of the American Telephone and Telegraph Company (AT&T) and Western Electric were consolidated into Bell Telephone Laboratories. Their mission was to research and design communication technologies for the rapidly expanding telephone network and to explore fundamental areas of science that could shape the future of the industry. Over the years, many cornerstone technologies of modern society have been invented at Bell Labs and 8 Nobel Prizes have been awarded to its researchers

1925

1930's

1937 Electron Diffraction
Demonstrating wave nature of matter

1954 Solar cells

1940's

1948 "A Mathematical Theory of Communications"
By showing that all communications channels – of any type – have a fundamental capacity limit, Claude E Shannon founded the field of information theory

1950's

1956 Transistor
To replace the vacuum tube, Bardeen, Brattain and Shockley created a working point-contact transistor. This basic building block for all digital products is the foundation for our information society

1958 LASER
In their 1958 paper, Schawlow and his brother-in-law Townes described in detail a proof of concept for the LASER. The laser enables a wide variety of applications: fiber-optic communications, digital storage, barcode scanners, precision surgery and industrial cutting tools

1960's

1962 Telstar
Transatlantic live TV broadcast via satellite

1970's

1973 UNIX and C Language
Thompson and Ritchie's elegant design made it an immediate hit with the programming community when it was released in 1974. UNIX would later on become the Internet's foundation

1976 Fiber Optic Network
First demonstration of 45 Mbit/s transmission

1977 Electronic Structure of Magnets and Glasses

1978 Commercial Cellular Network
Invention of the cellular concept and creation of the first commercial network

1978 Cosmic Microwave Background Radiation
Pioneering work on radio communications using the Holmdel Horn Antenna provides support for the Big Bang Theory

1980's

1980 Demonstration of DSP
Large-scale integrated circuit for digital signal processing

1995 Commercial DWDM
Pioneering work on wavelength multiplexing in optical fibers

1990's

1995 Integrated ADSL Chip
After co-inventing ADSL technology, follow-up innovations like vectoring continued to generate world records for high speed data transfer over copper telephone lines, fueling the Internet

1997 Laser-Based Cooling and Trapping of Atoms
To understand the fundamental limits of materials and matter

1998 Wireless MIMO Spatial Multiplexing
Invention of wireless transmission based on multiple spatial paths

1998 Fractional Quantum Hall Effect
Discovery of a novel collective quantum fluid state of matter

2000's

2006 Software Defined Routing
Predecessor of Software Defined Networks (SDN)

2009 CCD
Boyle and Smith's picture phone research realized the enormous potential of the Charge Coupled Device as an imaging device, leading to the invention of the digital photo, video cameras, scanners, satellite surveillance and ultra-sensitive astronomical telescopes

2009 Coherent 100G Optics
Invention of the future of high speed optical communications with coherent processing

2009 World's first standard compliant LTE call

2010's

2011 lightRadio Cube
First demonstration of building block of future small cell wireless networks

2014 XG-FAST
First demonstration of 10 Gbps over copper telephone wires

2014 Fluorescence Microscopy
Ground-breaking work on sub-wavelength optical microscopy leads to super-resolution microscopy at cellular level

2015 GreenTouch
International consortium delivers new technologies to improve energy efficiency in wireless networks by more than 10,000X

2015 Optical MIMO-SDM
Pioneering work on utilizing the spatial dimension in fiber, showing greater than 10X increase in optical network capacity

2015 The Future X Network: A Nokia Bell Labs Perspective
First Nokia Bell Labs book written

2016 5G Massive Connectivity
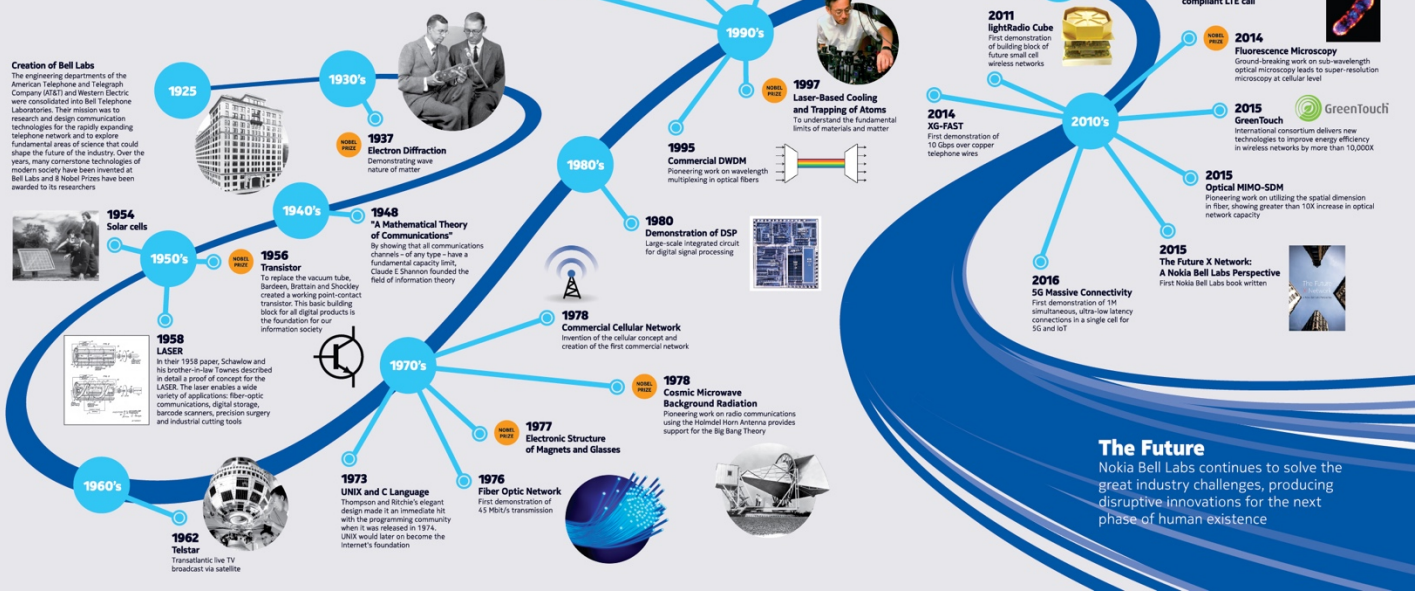First demonstration of 1M simultaneous, ultra-low latency connections in a single cell for 5G and IoT

The Future
Nokia Bell Labs continues to solve the great industry challenges, producing disruptive innovations for the next phase of human existence

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BACKEND RESEARCH ENGINEER
Social Dynamics Research, Nokia Bell Labs, Cambridge

The Social Dynamics team at Bell Labs Cambridge (UK) has one open position for backend engineers. Candidates who have the aspiration to work in a highly-dynamic research environment are particularly valued.

Nokia and Bell Labs
Nokia is a global leader in the technologies that connect people and things, and Bell Labs is a worldwide research and development community that focuses its efforts on key technologies. It is internationally renowned as the birthplace of modern information theory, the transistor, the laser and the UNIX operating system.

Bell Labs Cambridge
As part of the emerging research area of "Computational Social Science", the Social Dynamics team answer questions typical of the social sciences using computational methods and, in so doing, produce long-term research (in very 'Bell Labs' style). Members of the team include Daniele Quercia (www.researchswinger.org), Luca Maria Aiello (www.lajello.com), and Miriam Redi (www.visionresearchwitch.com).

Main responsibilities
1. Develop backend web applications, demonstrators, and RESTful APIs
2. Collaborate closely to a mixed team of Engineers and Scientists to translate research outcomes into scalable solutions for end-user products

Expected qualifications, skills and experience
1. BSc or above in Computer Science, Engineering, or related field
2. Strong development skills in Python, Java, C, PHP, JavaScript (and associated libraries), MySQL, PostgreSQL.
3. Web Services development and deployment (Java EE, Node.js, or equivalent).
4. System engineering experience (Linux environment). Deep knowledge of the UNIX operating system and of Shell programming.
5. **Preferred:** experience working with GIS backend technologies (e.g., PostGIS, CartoDB), NoSQL databases, machine and deep learning tools (sci-kit learn, caffe), distributed computing frameworks (MapReduce, Hadoop, Spark), and Configuration/Management of scalable/flexible Cloud Computing Services (Amazon, or Google).

Please send your CV and a brief cover letter with the subject line "Backend" to daniele.quercia@nokia-bell-labs.com at earliest convenience For informal inquiries, please contact daniele.quercia@nokia-bell-labs.com.