

## CURRICULUM VITAE

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**Date of Birth** : 19th June 1972

### Educational Qualifications:

**Doctoral Research** : My research has successfully advanced within the framework of my Ph.D. co-supervision Professor Habib Bouchriha of the University of Tunis El Manar myself, and Professor Maksim Skorobogatiy Prof. Chair of Research in photonic crystals (Génie physique) Ecole Polytechnique of Montréal using the photonic crystal fibre as a sensor.

**Topic of Post Doctoral Research:** “Biosensor Using Photonics crystals fiber”.

- Supervisor** : **Prof. Habib Bouchriha**
- **Ph.D.,** : **Quantum Physics (2004-2008 December)**
  - **Master of Science** : **Quantum Physics, August 2003.**
  - **Bachelor of Science** : **Science Physics, University Tunis El Manar, Faculty des sciences de Tunis , July 1998.**

### Techniques acquainted:

- Test and study the transmission performance of polymer micro structured fibers used for sensing.

- Design micro structured fibers for sensing applications using Supercontinuum source.
- Simulation and configurations of photonic crystal fiber using finite difference method, and multipole method.

### **STATEMENT OF WORK HISTORY DURING Ph.D:**

#### **Micro structured fiber assisted sensing:**

This work lies within the scope of optical fibres sensors development based on micro structured fibres. The inherent advantages of these special fibres, resulting from the innovative technology, are due to related to the presence of air channels within the cladding. Telecommunication industry as well as instrumentation can draw profit from possibilities offered by “custom” design of this type of guide, achieved through the stack of rods and silica capillaries, each of them constituting many zones of the preform from which would be manufactured micro structured fibres. Thus, it is possible to use the interaction between the electromagnetic field of the optical wave and the liquid medium, even solidified, present in the aforementioned channels to produce transducers or active light modulators for example. Beyond, fiber design makes it possible to optimize the measurement sensitivity to the required parameters. Finally, taking advantage of Femlab and Cudos Mof, we simulate the cladding and core mode propagating inside the fiber and interact with the liquid medium.

The present investigation was undertaken with the following objectives:

- Investigate an integrated optical biosensor using a Supercontinuum generator (SC) with and adequate photonic crystal fibres (PCF).
- To study the Bragg Fiber and the Effect of Long period grating photo-written in a Holey Fiber

Actually, by using the designed high numerical aperture (high NA) fibre we have shown a new approach to enhance the evanescent field compared to usual fibre used for gas/liquid sensing. This achievement using suspended microstructure core fibre in air by three bridges which support the cladding fibre confine properly light in the inner core. This enhancement is a particularly difficult task when dealing with short wavelengths as it is (usually) the case with polymeric fibres or, in general, when the interest lies in the UV / visible region. By using this proposed fibre , the increase in sensitivity are related to the fraction of energy launched from the Gaussian beam which still going to be well confined inside the core and having an absorption coefficient analogous to a polymer rod of PMMA having a diameter equal to the core dimension fibre.

In the other hand sensor based on Long -period Grating photo writing in an endlessly single mode micro structured fibre and sensitivity study are related to the spectral resonance shift according to the refractive index of the medium inserted into the fibre holes and this for several fibre designs. The principle of measurement is to follow the wavelength shift of Bragg resonance according to the refractive index of the medium inserted into the holes. In complement to index measurements, a preliminary study was carried out to highlight the possibility to increase the refractometry sensitivity of a designed Fibre photo written in a micro structured fibre, while inserting liquid.

In the future the way is wide open for a new type of sensors based on Long Bragg gratings fibre; optimized micro structured fibres and fluid devices to insert or extract liquids used as sensor. The fields of potential application cover numerous sectors such as biology, chemistry or environment analysis.

## **PUBLICATIONS**

1. **Polarization and crosstalk in photonic crystal waveguides with bends. (2006) Synthetic metal; 156: 42-45.**

(D.Gamra, D. Khadri, F.AbdelMalek, and H.Bouchriha -*Laboratoire de Physique Quantique et Photonique, Faculte des Sciences de Tunis, BP 1060 Cedex, Tunis, Tunisia*)

2. **High numerical aperture polymer micro structured fibre with three super-wavelength bridges.**

(In submission at **Optics Letter** 2008-Dhia Khadri(1), Bertrand Gauvreau(1), Ning Guo, Alireza Hassani and Maksim Skorobogatiy -*Ecole Polytechnique de Montreal, Genie Physique, Montreal H3C 3A7, Canada*)

3. **on the Validity of the Effective Index Method for Long Period Grating Photonic Crystal Fibers.** (In submission at Infrared Physics & Technology2008- D. Khadri,

D.Gamra, F.AbdelMalek, and H.Bouchriha -*Laboratoire de Physique Quantique et Photonique, Faculte des Sciences de Tunis, BP 1060 Cedex, Tunis, Tunisia*)

## **SYMPOSIA/ MEETINGS/CONFERENCES/WORKSHOPS ATTENDED**

1. **Suspended Core High Numerical Aperture Multimode Polymer Fiber," CThV7,CLEO 2008.**

(B. Gauvreau, D. Khadri, N. Guo, and M. Skorobogatiy, *Ecole Polytechnique de Montreal, Genie Physique, Montreal H3C 3A7, Canada.*)

2. **National meeting of Research of physique Sousse- December 2006 (Design and study of all optical switching systems)**

(D. Khadri, D.Gamra, F.AbdelMalek, and H.Bouchriha -*Laboratoire de Physique Quantique et Photonique, Faculte des Sciences de Tunis, BP 1060 Cedex, Tunis, Tunisia*)

**3. National meeting of Research of physique Hammamet- December 2005 (The use of photonic crystal fiber in the telecommunication)**

(D. Khadri, D.Gamra, F.AbdelMalek, and H.Bouchriha -*Laboratoire de Physique Quantique et Photonique, Faculte des Sciences de Tunis, BP 1060 Cedex, Tunis, Tunisia*)

**ACTIVE MEMBER**

**1. Member** at the Physics Society Of Tunisia since 1999

**2. SPIE Member** (The International Society Of Optical Engineering).

**3. Expert on the application of photonic crystal fibre** (Technologic park of Raoued

Tunis With the contribution of Professor Faouzia Ben Bouzid)

**PROFESSIONAL EXPERIENCE**

**2001 -2007**      **Technical Expert** (Responsibilities)

(Tunisie Telecom)

- Voice Telephony and LAN Network
- Maintenance and supervision of the switching system (AXE, Ericsson)
- Management of subscriber
- Diagnosis hardware and software problems
- Responsible for the day-to-day operation of ADSL subscriber & voice communications.
- Ability to describe technical concepts to non-technical people
- Install and configure new or repaired fault and related equipments
- Having talent to solve problems creatively

**1998-2001**      **Manager of production**

Society of study and metal construction

**Responsibilities:**

- Assist, the general department in establishing the management objectives.
- Collaborate with administrative unit and technical team.

### **ACHIEVEMENT :**

- Wrote Manual procedures to assure monitored application of procedure. (On the metallic construction applied to the bridge) used by the company.
- Awarded best prize for purchasing sheet material and consumables (1999, Society of study and metal construction)

### **SKILLS**

- Good Negotiation Skills
- Excellent People Management Skills
- Language Skills: English, French and Arabic
- Educational background in Physics and Computer Science.

**REFERENCES:**

**1) Prof. Habib Bouchriha**

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**2) Prof. Maksim Skorobogatiy**

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