Vladimir F. Tamari's application for the Carl Zeiss Research Award 1996

(It contains a highlighted reference below to a time-resolved self-luminous i.e. florescent superresolving microscope idea of 1983. An identical concept was awarded the 2014 Nobel Prize in Chemistry)

Carl Zeiss Research Award

1996

Every two years the Ernst Abbe Fund presents the Carl Zeiss Research Award. It is conferred for outstanding scientific achievements in basic research and applications in the overall field of optics. The sum allocated to the award totals

DM 50,000.–

The award is aimed primarily at qualified, preferably young scientists. The achievements of individuals or of small groups will both be taken into consideration.
Recommendations and personal applications should be sent before

September 30, 1995

to
Ernst-Abbe-Fonds im
Stifterverband für die Deutsche Wissenschaft
Barkhovenallee 1
Postfach 16 44 60

D-45224 Essen

enclosing a review of the scientific work on which the application is based, a curriculum vitae and a brief outline of the candidate´s scientific career.

The award will be presented during the annual meeting of the German Society for Applied Optics (DGaO) on May 31, 1996 in Neuchâtel/Switzerland.

ERNST ABBE FUND

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Circle No. 436

CARL ZEISS RESEARCH AWARD 1996

ERNST -ABBE - FONDS IM
Stifterverband für die Deutsche Wissenschaft
Barkhovenallee 1
Postfach 16 44 60
D-45224 Essen GERMANY

Applicant: VLADIMIR F. TAMARI
President, Tamari 3DD Co. Ltd.
4-2-8-C26, Komazawa,
Setagaya-ku, Tokyo 154
JAPAN

Tel: (03) 3795- 6673

Research Subject: THE CANCELLATION OF DIFFRACTION IN WAVES

Enclosures:
- **I. Review of my De-Diffraction Research**
  - **Curriculum Vitae**
  - **Outline of my Inventions and Scientific Career**
  - **List of my Optics Papers**
- **II. "*The Cancellation of Diffraction in Wave Fields*"**
- **III "*From Diffraction to De-Diffraction* "**
- **IV Copies of my two U.S. De-Diffraction Patents**

VLADIMIR F. TAMARI

Curriculum Vitae

1942	Born in Arab Jerusalem, Palestine
1949-57	Friends Boys School, Ramallah
1967-61, 63	Studied physics and then art , American University of Beirut, Lebanon
1961-62	Studeied painting at St. Martin's School of Art, London
1962-64	Invented improved Arabic type design, invented 3D drawing instrument Corresponded with NASA about an idea for lunar mapping
1965-66	Pendle Hill School, Pennsylvania, U.S.A.
1966-70	Employed as film technician and illustrator, UNRWA-UNESCO Beirut.
1970-95	Self-employed in Japan as artist, inventor and researcher in physics. Also taught at Tokyo University, worked for Radio Japan, illustrated children's books, and held exhibitions of 3D drawings and watercolor paintings throughout Japan, also in the Middle East, Europe (including Germany, Austria and Switzerland) and the U.S.

- At various times member of Optical Society of America
  SPIE - International Society for Optical Engineering
  Japan Graphic Science Society
  Union of Palestinian Artists

- Held post as International Co-Editor, *LEONARDO* Journal (Pergamon Press, Oxford)

- Citizen of Jordan. Married to Kyoko Miyakoshi since 1967, with two daughters Mariam and Mona. Orthodox Christian faith.

- Reference: Dr. Hanna M. Nasir, President, Bir Zeit University, Bir Zeit, West Bank.

REVIEW OF MY DE-DIFFRACTION RESEARCH

DE-DEFFRACTION , (DD), is the method I invented for creating diffraction-free waves in any kind of field, including electromagnetic, acoustic and fluid fields. DD allows superresolution beyond the "diffraction limits" in imaging and the propagation of beams such as lasers, without spreading. This will have revolutionary applications in such instruments as cameras, telescopes and radar, and in such devices as microwave antennas, optical memory storage and many others.

Mathematically, a DD field is a soliton, a wave that does not change its shape while propagating: solitons are known to exist in water waves and in subatomic particle fields, so theoretically it is possible to have soliton solutions for other waves, for example in non-diffracting microwave beams that can go to the moon without spreading, or an imaging radar field superfocussed to a point much more intense and concentrated than the 'diffraction-limited' Airy function.

Starting from 1980 I started an intense course of self-study and experimentation in modern optics, carried on at home to try to improve telescope resolution. I developed analog-digital calibration methods and others where annular aperture configurations are linked to algorithms used to digitally restore an image and achieve super-resolution beyond the Raylegh limits. This was my goal.

In late 1984 I had an idea that if diffraction was the fan-like spreading of the energy streamlines of the field as they leave the aperture, then it can be cancelled by simply refocusing these streamlines mostly within a wavelength near the aperture edge. I experimented with water and ultrasound waves generated by reflectors with curved edges, and observed qualitatively that diffraction is cancelled or reduced. I am now very confident that DD works perfectly, and that its study has to be carried on by those more qualified than me both in theoretical analysis and practical applications.

There were three sources of difficulty in carrying out my DD research. One was the fact that I was an amateur working practically alone with minimum equipment. The other was the stress and worry that DD will have important military applications, and so I tried to send my results both East and West. The third difficulty was theoretical: From the start, Heisenburg demonstrated his uncertainty principle by showing how a photon diffracts and its position is therefore uncertain. But a non-diffracting laser beam will have its position and momentum vectors fully determined at all times. How can quantum considerations allow DD? Over the years I have tried to cope with this difficulty and I have outlined a theory whereby these contradictions are reconciled. But I think it is only fair to await experimental verification of DD before tackling these theoretical considerations.

It is possible to test DD by the methods I referred to in my patents and papers enclosed here, for example giving an aberration-free lens a bevel edge a few hundred wavelengths wide. (Note: the curves described on p.75 of my *Optoelectronics* paper are correct only qualitatively. And testing DD by computer simulations based on the Huygens principle simply will not work, because it is an approximation that fails to describe the field within a wavelength of the aperture edge).

OUTLINE OF MY INVENTIONS AND SCIENTIFIC RESEARCH

As an independant self-employed researcher, I have made scores of inventions in different fields. Knowledge of one field often inspired work in another. Some of the following ideas have been developed into commercial products, while others remain in my notebooks. In some cases I have written and sometimes published papers about these ideas (see following page). For economic reasons I have applied for patents for only a few of my inventions.

IMAGING / OPTICAL INVENTIONS:

- **Calibration of scanning-radar response *in situ*, electronically subtracted from new scans of the same location, to show objects in the presence of noise (1968)**
- **Stereoscopic camera focusing method (1975)**
- **Analog-Digital calibrating method for any imaging instrument in general, allowing imaging with highly distorted optics (1980)**
- **Annular aperture design ombined with image processing to obtain superresolution (1982)**
- **Scanning with a point source to generate autostereoscopic images (1981-83)**
- **Superrsolved microscopy by time-resolved imaging of faint self-luminous objects (1983)**
- **The Cancellationof Diffraction (1984-95)** ***(papers and patents listed next page)***
- **Combining Lippmann's autostereoscopic and color photography concepts in a new incoherent holographic system (1995)**

DRAWING INSTRUMENTS:

- **Stereoscopic 3D Drawing Instruments (1964-80)**
  Stereoscopic Drawing Instrument: (Japanese Patent No. 762196 -1975)
- **Instrument to Draw Sun's Shadow for Architects (1979)**
  (Japanese Patent Applic. No. 55-160799-1980)
- **Perspective Drawing Device (1980)**
  Mechanical Perspective Drafting Device (U.S. Patent No. 4,672,749 -1987 and Japanese Patent No.59-131519- 1992)
- **A spiral compass (1981)**

MANY OTHER INVENTIONS INCLUDING:

- **Arabic Typography System (1962)**
  Improvements in Printing (British Patent No, 1011006- 1963)
- **Underwater and Dam Construction Using Freezing Methods (1963)**
- **New Concepts in Retractable Dome Design (1988)**
- **New Concepts in Wheel Design (1990)**

OPTICS PAPERS BY VLADIMIR TAMARI.

"Calibrated Digital Imaging Instruments": A system whereby the instrument's point response function is physically calibrated simultaneously in the object and the image fields pixel by pixel. The resulting matrix is used to efficiently restore even highly distorted images.*(With Capt.M. Kobori.1982, unpublished).*

"From 3D Drawings to 3D Focusing": A review of V. Tamari's work in stereoscopic drawing, with a proposal that camera focusing mechanisms be linked to a luminous sign suspended in visual space through binocular viewfinders. (Camera Review, Tokyo, Stereoscopy Issue, August 1984)

"The Cancellation of Diffraction In Wave Fields": An analytic and general survey of methods to obtain superresolution, and my ideas for the cancellation of diffraction. (Optoelectronics **2** No. 1, 59-82 Tokyo ,Mita Press, June 1987)

"From Diffraction to De-diffraction": A rigorous mathematical demonstration of the concepts of de-diffraction. (1993, *unpublished*)

"United Dipole Field": Shows that any dipole field (for example a charged particle near its anti-particle) consists of a pattern of curved streamlines, which can be interpreted in equivalent electromagnetic, gravitational and quantum-mechanical ways (1993, *unpublished*).

"Method and Means to Cancel Diffraction Effects from Radiation Fields": Contains a lengthy analysis of the proposal that a de-diffracted wavefront has curved edges (U.S. Pat. 5,148,315 - 1992)

"De-diffraction Methods"; A short improvement over the basic DD patent, describing how a wavefront (with small wavelength compared to the aperture) having simple bevel edges can minimize diffraction.(U.S. Pat. 5,392,155 - 1995)

"Influences and Motivations in the Work of a Palestinian Artist/ Inventor": contains an autobiographical explanation of how the De-Diffraction idea came about.
(Leonardo **2**, No.1 Pergamon Press,
Oxford,1991)

ERNST-ABBE-FONDS

IM STIFTERVERBAND

FÜR DIE DEUTSCHE WISSE

Vladimir F. Tamari
President
Tamari 3DD Co. Ltd.
4-2-8-C 26, Komazawa
Setagaya-ku, Tokyo 154

JAPAN

Carl-Zeiss-Forschungspreis und
Otto-Schott-Forschungspreis

09.10.1995/ku

Carl Zeiss Research Award 1996

Dear Sir,

many thanks for your application for the Carl Zeiss Research Award 1996.

The received documents will be sent to the Endowment Committee.

As soon as possible we will inform you about the Committee's decision.

Sincerely yours,

ERNST-ABBE-FONDS im
Stifterverband für die Deutsche Wissenschaft

Klaus Kuli

(Klaus Kuli)

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45239 Essen (Heidhausen)
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ERNST-ABBE-FONDS

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JAPAN

Carl-Zeiss-Forschungspreis und
Otto-Schott-Forschungspreis

25.01.1996

CARL ZEISS RESEARCH AWARD 1996

Dear Sir,

thank you for your application for the above mentioned award.

The Committee of the ERNST-ABBE-FONDS had to make a selection from a great number of excellent applications and proposals.

After careful consideration the Committee nominated

Dr. Dieter W. Pohl, IBM Zürich/Research Laboratory and

Dr. Eric A. Cornell, University of Colorado/Boulder

as winners of the award 1996.

We wish you all the best for your further work.

Yours sincerely,
ERNST-ABBE-FONDS im
Stifterverband für die Deutsche Wissenschaft

(Dr. Ambros Schindler)

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