PROGRESS IN THE DOMAIN OF PHYSICS APPLICATIONS IN LIFE SCIENCE WITH AN INVENTION FOR SUBSTANTIAL REDUCTION OF PREMATURE CANCER DEATHS:

THE NEED FOR A PARADIGM CHANGE IN ONCOLOGY RESEARCH

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[16] See http://www.gopetition.com/online/33546.html for full list of additional signatories

Following is the list of cosigners (over 1000 signatures, most of them received in three days, 29-31 January 2010) of this abstract and a petition requesting researchers to provide estimates of results in terms of reduction of premature cancer deaths at a lower cost per each life saved compared to current costs, and the supporting arguments for those estimates.

Signatory list continue. You can add your name at http://www.gopetition.com/online/33546.html, for English, or …/33549.html for Italian. Over 3000 new members joined this cause on facebook group during the last 70 hours (http://www.facebook.com/home.php?#/group.php?gid=307757694828&ref=mf)

Cosigners: Gian Piero Abbate, Katia Adam, Marcello Adduci, Miriam Agistri, Stella Aiello, Giovanni Aiello, Mattea Allegrini, Remo Allegrucci, Gianbattista Allievi, Maria Teresa Allione, Silvia Alloa Casale, Riccardo Aloidi, Luigi Altieri, Carmelo Amato, Antonino Amato, Alessandra Amato, Francesco Ambrosino, Cosimo Amoroso, Luigi Anastasio, Guido Ancilli, Paola Anfosso, Antonella Angelantoni, Anna Angelini, Domenico Appetiti, Domenica Aragona, Vince Arcobelli, Giovanni Arcostanzo, Maria Arcuri, Valerio Arenare, Lella Ar , Scott Arnold, Luisa Aru, Steven Ascheri, G L Ashton, Patrizia Astolfi, Nella Avanzo, Silvia Baccelliere, Concetta Baldassarre,

Dario Banaudi, Lorella Baralis, Patrizia Barattero, Giorgia Barbagallo, Aldo Barisione, Samantha Barlotti, Giovanna Barrera, Benedetta Bartolotta, Simonetta Bassetti, Michele fabio Bassetto, Laura Bellino, Veronica Bellotti, Antonino Benedetto, Giuseppe Benedetto, Giovanna Benedetto, Giorgio Beneventano della Corte, Maria Benincasa Khawaja, Al Benser, Salvatore Bentivegna, Courtney Bernabo, Rina Bernardi, Maria Bernasconi, Giancarla Bertero, Carla Bertini, Gianni Bertolani, Anna Maria Bertolin, Elsa Bertolin, Enrico Bertolin, Bruna Berutto, Silvio Bessone, Marcella Biagioli, Luca Bianchi, Rossella Bianchi, Cinzia Bianchi, Paola Bianchini, Simone Bianchino, Francesco Bianco, Emanuela Biffi, Adolfo Biscetti, Aldo Biselli, Faye Bishop, Anna Maria Boccato, Alessandro Boggian, Ernesto Boglione, Maria Bolignano, Matteo Bolla, Goffredo Bonadeo, Eleonora Boncristiani, Agnese Bonisolo, Marisa Borghi, Maurizio Borgonovi, Gabriella Boscolo, Egidia Bosis, Gabriella Bracciotti, Alessandro Brizio, Umberto Broggi, Sandy Broussard, Debra Bruce, Maurizio Brugiatelli, Andrea Bruna, Elsa Bruna, Debora Bruna, Angelo Bruno, Giorgio Bruzzone, Carmelo Bucca, Florinda Buono, Astrid Cabrera Varona, Salvatore Cadeddu, Rudina Cafuli, Mauro Caira, Domenico Calcagno, Luigi Calci, Annamaria Califano, Teresa Callegaro, Giorgia Cal•, Anselmo Cal•, Silvia Calvario, Angelo Camillo, Cinzia Cammarere, Domenico Camonita, Giuseppina Campagna, Francesco Campanella, Cristina Campanini, Domenico Caneschi, Onofrio Cannav•, Anna Canti, Lina Capalbo, Arturo Capano, Sonia Capello, Linda Capparella, Manuela Caprari, Stefano Carabetta, Francesca Caramella, Rosalba Carando, Fabio Cardano, Carlo Carli, Carla Carola, Roberto Casalone, Massimo Caselli, Luciano Casi, Giovanni Casini, Antonio Cassin, Marcello Castellani, Gianni Casubaldo, Alice Catalano, Vincenza Cataldi, Alessia Catanzaro, Francesco Cattani, Chiara Caucci, Patrizia Cavallari, Gianni Ceccarelli, Maria Rosa Ceccarelli, Maria Teresa Ceccarelli, Paola Cecchin, Monica Celentano, Roberto Agatino Celisi, Vincenzo Celisi, Fiorella Cencetti, Gloriana Censi, Brunella Cerusico, Barbara Cerusico, Dante Cesauri, Maria luisa Chiambretti, Daniele Chimienti, Leonardo Ciacchini, Walter Ciacci, Andrea Cicchetti, Gianluca Cidonelli, Gaetano Cimmino, Aura Cintio, Paola Ciprianelli, Egidio Francesco Cipriano, Dorina Cirulli, Dora Cirulli, Alberto Clemente, Diane Clinkscale, Elvis Coebelli, Simone Cola, Andrea Colazzo, William Colburn, Jennifer Colburn, Anna Columbro, Diego Comin, Gianmaria Comincini, Cristian Compagno, Claudio Compagnucci, Cathy Conley, Mario Contarino, Chiara Contini, Alessio Corbacio, Arianna Corbacio, Vincenzo Corbacio, Elvis Corbelli, Gaetana Cori, Donatella Corona, Francesca Corsaro, Graziella Corsi, Annalisa Corso, Epifania Aurora Costanzo, Francesca Cotroneo, Daniel Covatta, Giuseppe Cozzolino, Maria Giuseppa Cresci, Tiziana Cresci, Eleonora Crespi, Susan Critelli, Raimondo Cucchira, Pino Cucci, Mariagrazia CuddŠ, Lucette Cumming, Gianfranco Curreri, Patricia Curtain, Gabriella Cuttica, Giuseppe Da Pozzo, Ivana Dagnono, Valeriu Dajbog, Lorenza Dal Lago, Giovanni Dal Molin, Marco D'alessandro, Fabio Dalla Libera, Manuela Dalmasso, Adele D'amato, Stefania D'andrea, Francesca D'Andreamatteo, Pompea D'Andreamatteo, Danila D'Andreamatteo, Alessandro D'Andreamatteo, Carlo D'Andreamatteo, Marco D'Andreamatteo, Giulia D'Andreamatteo, Francesco D'Angelo, Bonni Davi, Raffaella De Cesare, Emiliano De Cesare, Vincenzo De Filippo, Gian Luca De Filippo, Elisabetta De Giuer, Livio De Lorenzo, Antonella De

Lucia, Anna De Sanctis, Marco De Santis, Marina De Santis, Sabrina De simone, Giuseppe De Stefano, Maria De Vries, Flavia Deandreis, Agostino Debidda, Roberto Dedomenicis, Patrick Del Bianco, Emanuela Del Gatto, Micol Del Monte, Rita Del'erba, Marco Delfino, Marco Della Corte, Dara Dell'acqua, Mattia Delpopolo, Gian Piero Demuro, Antonia Denina, Fabio Dentello, Alessandro D'Errico, Domenica Detefanis, Anna Detefanis, Margherita Detefanis, Daniele Di Cerbo, Massimiliano Di Fede, Amanda Di Giorgio, Maria Antonia Di Giovanna, Maria Di Natale, Tiziana Di Noi, Giancarlo Di Porto, Gaetano Di santo, Lidia Di Stefano, Enrico Dinelli, Elia D'intino, Laura Diomede, Floriana Dolce, Gianna Donati, Ian Donnan, Vincenzo Donnini, Chiara Dorella, Stefania D'orio, Nicola D'Ugo, Argene Duranti, Marina Eandi, Dannah Edwards, Elisabetta Endrizzi, Paola Ermini, Grazia Esposito, Guido Evangelista, Silvia Facchin, Paolo Fadda, Ambra Falco, Paola Falsone, Daniele Farascioni, Franco Farascioni, Giuseppe Farris, Franco Farru, Lucia Fascianelli, Fiamma Fascianelli, Alessandro Fascianelli, Franco FASCIANELLI, Paolo Felci, Diego Felice, Anna Maria Fenu, Chloe Fergus, Linda Ferlin, Stefania Ferracuti, Giuseppe Ferrarecce, Fiore Ferrari, Flavio Ferrari, Gottardo Ferreira Dias, Dario Ferrero, Francesco Ferro, Giuseppe Fiannaca, Anna Fiaschi, Claudio Ficco, Fabio Fignani, Giovanna Filippone, Deliana Finazzi, Giuseppina Fiorito, Jayne Fischer, Claudia Flint, Davide Florino, Massimo Flumeri, Massimiliana Fontana, Fabio Fontana, Remo Foracappa, Nicoletta Fortivo, Silvio Fregonese, Cinzia Frontini, Placido Fundaro', Marco Furlanetto, Roberto Gabellini, GAETANO GAETANO, Linda Galiano, Franco Gallarato, Alessandra Gallarato, Maria Caterina Galleano, Patrizia Gallitto, Viviane Gallo, Silvana Gallo, Gianpiero Gambardella, Alessandra Gammarota, Luisa Gangemi, Valentina Garbati, Antonella Gargano, Giuseppe Garofalo, Roxanne Garrett, Carlota Garza, Karin Gasert, Vincenzina Gastaldi, Federica Gavotto, Elisabetta Gaziano, Vincenzo Gazzillo, Patrizia Gennaro, Antonella Ghezzi, Maria Pia Ghignoni, Maria Alfonsina Ghini, Alessandro Ghironi, Maria Antonietta Giagheddu, Germano Giallombardo, Gaetano Giammarino, RAUL GIAMPA', RICCIO GIANFRANCO, Claudio Gibilisco, Maria Giorgianni, Ligia Giraldo, Carlo Giuberchio, Valeria Giudice, Gaetana Marcella Giuffrida, Mario Giuli, Catiuscia Giuli, David Giuliani, Marco Giurisato, Dina Goione, Valerio Gonella, Dariena Gonzalez Varona, Lucia Pia Gorgoglione, Massimo Gori, Carlo Alessandro Grano, Patrizia Grasso, Patrizia Grasta, Daniela Grazzi, Harold Green, Marina Greganti, Patricia Gregory, Edward Gregory, Laura Grigoletto, Eligio Grigoletto, Barbara Grigoletto, Andrea Grimaldi, Domenico Grimaldi, Grazia Grossi, Maurizio Guarino, Agata Guarrera, Melania Guarrera, Annamaria Guerra, Marco Guerra, Franco Guerrazzi, Rosita Gugliotta, Letizia Gulizia, Ella Gustafson, Sirine Haj Sassi, Richard Hallett, Bea Bea Hedstrom, Borje Helgesson, Christopher Hill, EJ Hoffer, Graeme Hosking, RITA IAFRATE, Valeria Iannuzzi, Santina Iapichello, Stefano Idolo, Tommaso David Incamicia, Alberto Indri, Sabrina Innocenti, Fabrizio Internullo, Vito Introna, Tiziana Iozza, Giuseppe Iozzia, Donatella Isnardi, Cerasela Darosa Jica, Gail Jones, Luciana Jorio, Gay Jurgens, Elsje Kantelberg, Wanda Kiewiet, Holly Kuper, Paola La Magna, Alessandro La Porta, Cosima Lacorte, Maria Lamboglia, Susan Langford, Elisa Langone, Lara Lari, Paolo Lauretta, Lino Lausi, Gandolfo Lavanco, Adriano Lazzarini, Gregory Lemoine, Federica Leonardi, Mariagrazia Levato, Angela Li

Greci, Livio Lingua, Daniele Lingua, Massimo Lingua, DESIDERIO LO BUE, Gaetano Lo Valvo, Paola Lo Valvo, Giovanni Lombardo, Antonella Lomi, Armando Longo, Ilona Longo, Ilaria Lorefice, Carla Lorenzi, Annita Lorenzotti, Alessandro Lucca, Alessandra Luise, Concetta Lumari, Carla Luvar…, Anton Luigi Maccagno, Giuseppe Maccagno, Patrizia Maccarrone, Antonino Maccarrone, Monica Maffei, Mario Maggi, Rossana Maiocchi, Giuseppe Majocchi, Cynthia Maki, Daniele Malandrino, Consolato Malara, Raffaele Mana, Marco Manenti, Chiara Mangiulli, Sabrina Mantica, Sandra Mantovani, Federica Manzelli, Marco Marabotto, Federico Marabotto, Bruno Marabotto, Giuseppe Marabotto, Fabrizio Marconato, Paola Marconi, Francesca Mari, Angela Marrella, Giuseppe Marroccoli, Mitchell Martinez, Paolo Masa, Paolo Massa, Marilena Massardi, Mara Massini, Mario Rosario Mastropaolo, Giovanni Mastropaolo, Anna Matranga, Francesco Mattacchione, Mary Matthews, Luca Mazzaferri, Alessandro Mazzamuto, Anna Mazzei, Giorgio Medone, John Mehrak, Marina Melaragni, Paolo Melli, Patrizia Meloni, Ettore Memmola, Lucia Messineo, Luisa Miccinilli, Giulia Micco, Mauro Migli, Tommaso Mignini, Lorenzo Milazzo, Carla Minaldi, Patrizia Minazzi, Adolfo Minetti, Mariagrazia Minnella, Aldo Moioli, Paola Molinas, Stella Claudia Monachesi, Angelo Monaco, Salvatore Monaco, Ann Mongomery, Rossella Morbello, Emma Moriconi, Antonio Moscato, Andrea Moscheni, Miriam Mosconi, Leonardo Mulone, Calogero Mulone, Patrizia Mura, Sabrina Muranelli, ULIANA NANNI, Lucia Napoli, Monica Nassisi, Patrizia Nasuti, Greg Neale, Ambrosio Nereo, Luigi Nesta, Andrea Nizzola, Massimo Nosetti, Carola Nunzi, Leila Nur, Ardian Nuredini, Gary OBrien, Robert Okuszka, Antonino Oliva, Rossana Mariela Olivares Hernandez, Francesco Olivieri, Roberto Onofri, Patrizia Orazzini, Malvina Orru', Antonella Paci, Stefano Pacini, Giuseppe Pacino, Gianpiero Padedda, Giampiero Padedda, Claudio Pagani, Norma Palermo, Teresa Palmieri, Giuseppina Panaro, Laura Panaro, Miriam Panaro, Alexandra Pango, Bruna Pansa, Fabrizio Panuello, Ferrua Paola, Filomena Papa, Mario Giovanni Pappalardo, Pietro Parodi, Maria Pia Pasqualucci, Giuseppe Passafiume, Guglielmina Patrizia, Alberto Patrone, Anna Patti, Claudio Pautasso, Giovanna Pavese, Ivonne Pearson, Carl Pearson, Janet Peavler, Eleonora Pecce, Cindy Peck, Ernesto Eugenio Pelli, Adolfo Pepe, Giorgio Peretti, Paola Peretti, Lella Perico, Silvana Perini, Marco Pernigotti, Giuliana Perrone, Francesca Perticari, Magda Perucca, Brunella Pesce, Elvira Petrini, Laura Petrini, Giuseppe Pezzaniti, Giovanna Pezzella, Giulia Piacentini, Adriana Piazzi, Michael Pieper, Ester Pierini, Tina Pietropaoli, Carmen Pino, Paolo Piomboni, Valentina Pistis, Alice Piuma, Giuseppe Pluchino, Marco Pocchiola, Daniele Pochini, Antonio Pocobello, GRETA PODDA, Valeria Poggi, Mauro Poggi, Barbara Poggioni, Francesco Pontevolpe, Sandro Portello, Lane Powell, Giuseppina Pressato, Emanuela Pretto, Franco Prosperi, Giacomo Pucci, Matteo Pucci, Gioirgio Pucci, Carla Puddinu, Franco Puglisi, Cristina Pupparo, Ilaria quilici, Consuelo Ragazzi, Mattea Raia, Jacopo Ramonda, Giulia Rana, Maurizio Rana, Diane Randolph, Mario Ranieri, Iris Rapi…, Alfio Rapisarda, Iris Rapit…, Rosario Raudino, Fausta Recchia, Gabriella Regali, Olida Renzi, Lida Renzi, Mario Rezoagli, Erica Ribetti, Carla Riccardi, Monica Ricci, Maela Riccietti, Patrizia Rigliaco, Antonio Rigoni, Francesco Rimicci, Gilberto Ripanti, Pietrina Rivano, Vilma Rivoira, Irene Robbione, Vito Rodio, Vito Romanazzi, Roberta Romanini,

Carlo Romano, Melania Romeo, Valentino Romoli, Luciano Ronchini, Wanda Rondino, Antonio Rosa, Giancarlo Rossi, Paola Rosso, Piero Rota, Antonio Rotolo, Cristina Rubino, Manuele Ruggeri, Sergio Russo, Alberico Russo, Maria Immacolata Russo, Mario Russo, Dino Saia, Rosa Salustro, Marcello Salvaggi, Luisa Salvatori, Ermanno Salvestrini, Emanuele Salvini, Monica Samp•, Angelo Sandri, Margarethe Sannino, Massimo Sans•, Marilena Sansoldi, Ippolita Santarelli, Carmela Santini, Alessandro Santoni, Remina Santoro, Stefania Saraceni, Angelo Davide Saraceno, Pietro Sardo, Roberto Saretti, Luigi Sarzani, Daniela Sassara, Francesco Scafuro, Ambra Scaglia, Palmiro Scalambrin, Dorotea Scalia, Ezio Scariolo, Giuseppe Scatigna, Massimo Schiavoneti, Annamaria Sciamanna, Sandro Sclafani, Angela Scognamiglio, Magda Scognamillo, Walter Antonello Scognamillo, Patrizia Scrudato, patrizia sebenico, Carlo Semeria, Matteo Sereno, Gian Luigi Sereno, Mariano Sereno, Marina Sermoneta, Tanja Sewell-Pattist, Alfonso Sferlazzo, Giorgio Sibaud, Roberta Sibaud, Marinella Sibona, Sergio Siccardi, Tom Simons, Tiziano Simonut, Roberto Sindici, Giulia Sinibaldi, Ketty Siracusa, Mauro Solari, Claudio Solarino, Mario Sorace, Emilio Sorbara, Erika Soriente, Pina Sorrentino, Katia Sorvillo, Sergio Sotgiu, Isabella Soverino, Alessandra Sozzi, Frank Spadaro, Giovanni Sparano, Stephen Sparta, Domenico Speciale, Kent Spielmann, Manuela Spiga, Roberto Spiga, Rosa Spina, Rosa Rita Spina, Mauro Sportelli, Andrew Steffee, Dawn Stickney, Marina Stocco, Maria Letizia Strano, Filomena Sulli, Angela Sulli, ALESSIO SUNDAS, Cristina Taccini, Francesca Taglialatela, Fabio Taibbi, Alessandra Tallarita, Nita Mae Tannebaum, Maria Silvia Tartaglione, Paolo Teobaldi, Carolina Tiengo, Enrico Tocci, Valeria Tognoli, Rosa Tognon, Valeria Toletti, Luciana Toletti, Claudio Franco Tolu, Gabriele TOLU, Antonio Toma, Giuseppe Tomaselli, Umbertina Tomaselli, Giovanni Tomasello, Amina Tomasi, Silvia Tombolella, Davide Tondi, Eros Tormena, Rossella Tortorici, Lucrezia Tortorici, Gail Townsend, Gaetano Trainito, Francesca Triscari, Carlo Trombetta, Sergio Tronci, Claudia Trussardi, Renato Tubere, Christian Turatti, Marcella Turco, Aldo Turco, Bruno Turrisi, Katia Tusa, Emanuele Umberto, Caterina Urzi, Simona Vacca, Nuccia Valenti, Valentina Valentini, Mariapia Valentini, Umberto Valentini, Sonia Valeriani, Giuseppe Vanni, Carlo Vassotto, Alessandro Vastola, Bruno Vendemia, Silvia Vergani, Danilo Verra, Maria Viera Williams, Anna Maria Viglietti, Vincenzo Vigna, Sara Vinai, Gisella Vincenzi, James Virden, Roberto Visca, Rosario Vitale, Maria Elena Vito, Annamaria Vitullo, Matteo Vogliobene, Russell Wade, Donna Williams, Fernandez Moreno Yisel, Chiara Zanardi, Ennio Zanghri, Luca Zappal…, Wanni Zarpellon, Maria Pia Zavanelli, Silvana Zaza, Massimo Zito, Valentina Zoppi, Radiana Zottarel.

ABSTRACT: Despite annual cancer costs of $741 billion/yr ($750/citizen), the 38 most industrialized nations had only 5% reduction in cancer deaths over the past 50 yrs (heart disease was reduced by 64%). This article provides links to source data (from Government Agencies and World Health Organization –WHO-), easily verifiable by laymen. It analyzes why cancer treatment costs increased about 100 times over the past 50 yrs and why cancer death reduction is nearly the same in less industrialized countries with much lower costs. It analyzes past errors to help correct them and identify new ways for the future. One striking solution is Crosetto's innovation for improving particle detection (recognized by an int'l review panel at FERMIlab, 1993). When applied to medical imaging technology, it can drastically reduce cancer deaths. Together with his other inventions, Crosetto conceived the innovative 3D-CBS technology (www.crosettofoundation.org/uploads/335.pdf), 400+ times more efficient than current 5000+ PET. The results of these innovations can greatly reduce radiation dosage and costs, which permits extensive screening for early cancer detection of high risk people (essential for cancer survivors). Since this drastically increases the chance of survival of high risk patients, the immediate funding of Crosetto's innovative 3D-CBS project is imperative. If not, other solutions claiming greater potential should be pointed out, such as a forum organized for reviewers and authors claiming higher impact. Each author needs to support claims, consistent with the law of nature and ultimately judged by experimental results. This article provides procedures to ensure funding only the best proposals. Because the goal of cancer research is to promote solutions to greatly reduce premature cancer deaths at lower cost per life saved, each proposal should clearly state estimated death reduction, costs and when results will be achieved.

The above abstract has been translated in the following languages.

Chinese, (www.crosettofoundation.org/uploads/357.pdf)

Dutch, (www.crosettofoundation.org/uploads/359.pdf)

English, (www.crosettofoundation.org/uploads/339.pdf)

French, (www.crosettofoundation.org/uploads/341.pdf)

German, (www.crosettofoundation.org/uploads/357.pdf)

Italian, (www.crosettofoundation.org/uploads/343.pdf)

Japanese, (www.crosettofoundation.org/uploads/358.pdf)

Portuguese, (www.crosettofoundation.org/uploads/345.pdf)

Russian (www.crosettofoundation.org/uploads/370.pdf);

Spanish. (www.crosettofoundation.org/uploads/342.pdf)

This abstract (together with the one on page 12, specific to the 3D-CBS innovative technology targeted to early cancer detection) was submitted to the Workshop on Physics for Health organized by CERN, the renowned research center (that received over $12 billion to build the most powerful machine in the world for particle detection) with the expectation that they will guarantee the correct scientific procedure that will identify and support the best innovations targeted to the benefit of current and potential cancer patients.

For true progress in oncology research which translates into significant reduction of premature cancer deaths, a paradigm change is needed. For years, current practices for identifying research projects for funding has been missing a fundamental concept that has allowed projects which would ultimately achieve significant reduction in premature cancer death to be overlooked, misunderstood, and ultimately unfunded.

It is the responsibility of those deemed to be the greatest experts in the Domain of Physics Applications in Life Science, specifically CERN decision makers and scientists, to make this paradigm change, and thus recognize innovations through a fair "peer review" process where experts, reviewers, and proposers of innovations while meeting together, all have to provide scientific arguments in agreement or disagreement (accept/reject) with someone's else claim so that innovations benefitting the patient will not be missed, delayed or blocked. If agreement is not reached, they should agree on the least expensive experiment to place judgment where it belongs: "to the law of nature," not to the opinion of a reviewer or of an influential scientist, so that innovations benefitting the patient will not be missed, delayed or blocked.

Physicians, cancer patients and the public are looking to CERN to make this happen. We are gratified that CERN has taken charge of the problem by organizing this workshop. Now we must help to make this happen by working together.

This workshop was announced on 23 November 2009 with the following title and purpose:

WORKSHOP: "PHYSICS FOR HEALTH IN EUROPE"

(Towards a European roadmap for using physics tools in the development of diagnostics techniques and new cancer therapies)

CERN is pleased to announce the first workshop on ***Physics for Health in Europe*** which will be held at CERN, Geneva, Switzerland, on 2- 4 February 2010.

The purpose of the workshop is to review the progress in the domain of physics applications in life science

Full program: http://physics-for-health.web.cern.ch/physics-for-health/

The team of influential people reviewing progress in the domain of physics applications in life science, to be introduced by **CERN Director General Rolf Heuer** (rolf.heuer@cern.ch), consists of: **CERN *Research & Scientific Computing,* Sergio Bertolucci** (sergio.bertolucci@cern.ch); **Chairman** of the session: Radiology in therapy and space science, ***Marco Durante*** (m.durante@gsi.de); **Chairman** of the session: Radioisotopes in diagnostics and therapy, ***Jean-Francois Chatal*** (chatal@arronax-nantes.fr), **Rapporteur:** ***Ulli Köster*** (koester@ill.eu); **Chairman** of the session: Prospects in medical imaging, ***Alberto del Guerra*** (alberto.delguerra@df.unipi.it), **Rapporteur:** ***Wolfgang Enghardt*** (wolfgang.enghardt@oncoray.de); **Chairman** of the session: Novel technologies in radiation therapy, **Ugo Amaldi** (ugo.amaldi@cern.ch), **Rapporteur: Jean-Emmanuel Faure** (European Commission, Brussels) (jean-emmanuel.faure@ec.europa.eu); and the other members of the Program Committee: ***Steve Myers, Director for Accelerators and Technology*** (steve.myers@cern.ch); ***Bleddyn Jones*** (bleddyn.jones@rob.ox.ac.uk); ***Emmanuel Tsesmelis*** (emmanuel.tsesmelis@cern.ch); and ***Manjit Dosanjh*** (manjit.dosanjh@cern.ch) who selected topics, speakers and best posters toward the declared purpose of reviewing the progress in the domain of physics applications in life science for maximizing the reduction of premature cancer deaths at the minimum cost per life saved compared to current costs.

As the proposed document to support enhanced accountability in cancer research to support the purpose of the workshop, a compilation of responses from the form "Enhanced Accountability in Cancer Research" will provide the tool to move in that direction. Following is a blank form followed by an example of one completed by a researcher.

ENHANCED ACCOUNTABILITY IN CANCER RESEARCH

In order to achieve, as soon as possible, the maximum reduction in cancer deaths at the minimum cost for each life saved compared to current costs and allow for the possibility of a high rate of return on investment from long term research, it is necessary that each researcher submitting a cancer research project explain how their research would benefit current and potential cancer patients providing the information listed in the following form:

1. Cancer research title: _____
   _____
   _____
2. Principal Investigator – P.I. (Researcher proposing the research) _____
   _____
3. Category
   a) Category 1 __fundamental research (long term results available over ten years from now) or
   b) Category 2 __immediate application (results in reduction in cancer deaths and cost in less than 10 yrs)
4. Estimated percentage of lives saved annually from premature (< 75 years of age) cancer death __%
5. Scientific arguments supporting estimate (provide website or email address)_
   _____
6. Cost per life saved compared to the current costs _____
7. Total cost of the project _____
8. Estimated date of results from the time full funding is provided_____
9. **Results Measurement Plan** showing how estimates can be verified experimentally. (For example: a safe test on a representative sample of 10,000 people ages 50-75, selected from a population in a location with a constant cancer death rate of 50 deaths per year recorded over the previous 20 years). (provide website or email address). _____
   _____

Email Address: _____ Date: _____

It is of greatest importance that the following points be respected by all parties.

1. Research proposals will be divided into two priority lists referring to different funding pools in order not to penalize long-term research: one list for fundamental research and one for immediate short term results.
2. CERN must be responsible for organizing meetings for PI's to meet in their category group in order to support their claims and answer questions from colleagues and reviewers in a true "peer review" process.
3. Research institutions who participate are required to adhere to such standards that will free them from dereliction of their duties and remove fraudulent research from funding consideration.

The resulting two lists will be of use by organizations, governments and private donors to evaluate which proposals provide the best scientific arguments for reducing cancer deaths at the lowest cost per life saved compared to current costs.

Cancer research projects that cannot provide an estimate will not be funded. Those who cannot support their claims with scientific arguments will not be funded. Once funded, those who do not deliver what they promise after two years from the agreed date will have their funding cut.

IN THIS WAY, ONLY RESEARCH PROJECTS THAT HAVE REAL POTENTIAL TO DELIVER RESULTS WILL BE FUNDED AND MONEY NO LONGER WASTED WHILE GOOD PROJECTS GO UNFUNDED.

As an example, the following data was provided by the research Principal Investigator (P.I.) Dario Crosetto on his 3D-CBS project targeted to early cancer detection.

ENHANCED ACCOUNTABILITY IN CANCER RESEARCH

In order to achieve, as soon as possible, the maximum reduction in cancer deaths at the minimum cost for each life saved compared to current costs and allow for the possibility of a high rate of return on investment from long term research, it is necessary that each researcher submitting a cancer research project explain how their research would benefit current and potential cancer patients providing the information listed in the following form:

1. Cancer research title: **3D Complete Body Screening (3D-CBS) for Early Cancer Detection Targeted to Reduce Premature Cancer Death at a Lower Cost per Life Saved Compared to Current Cost**
2. Principal Investigator – P.I. (Researcher proposing the research) _____ **Dario B. Crosetto**_____
3. Category
   c) Category 1 __fundamental research (long term results available over ten years from now) or
   d) Category 2 _**X**_immediate application (results in reduction in cancer deaths and cost in less than 10 yrs)
4. Estimated percentage of lives saved annually from premature (< 75 years of age) cancer death __**33%**
5. Scientific arguments supporting estimate (provide website or email address)_ **http://www.crosettofoundation.com/uploads/134.pdf**
6. Cost per life saved compared to the current costs: __**1/40**____
7. Total cost of the project: **$15 million (to build three 3D-CBS devices)**_
8. Estimated date of results from the time full funding is provided_**3 years**
9. **Results Measurement Plan** showing how estimates can be verified experimentally. (For example: a safe test on a representative sample of 10,000 people ages 50-75, selected from a population in a location with a constant cancer death rate of 50 deaths per year recorded over the previous 20 years). (provide website or email address). **The test foreseen conforms to the example given above. See description at www.crosettofoundation.org/uploads/335.pdf**

Email Address: **info@crosettofoundation.org**__ Date: **02/02/2010**

The second abstract regarding the 3D-CBS technology, submitted to the workshop on Physics for Health by the author Dario Crosetto, follows:

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ABSTRACT

PROGRESS IN THE DOMAIN OF PHYSICS APPLICATIONS IN LIFE SCIENCE WITH THE 3D-CBS INVENTION FOR SUBSTANTIAL REDUCTION OF PREMATURE CANCER DEATHS: AN OPTIMIZED PET FOR LOW COST, LOW RADIATION DOSE, HIGH EFFICIENCY CANCER SCREENING

Dario B. Crosetto

Crosetto Foundation to End Premature Cancer Deaths, 900 Hideaway Pl.- DeSoto, TX 75115 – USA.
Email: crosetto@att.net – www.crosettofoundation.org

Experimental data demonstrate early detection obtainable through screening people at high risk saves lives. Signals most reliable for early detection show change in metabolism (up to 70 times higher in cancerous cells) at the molecular level. Early detection is achieved by accurate capture of all possible signals from tumor markers showing abnormal metabolism. Current PET exams are costly and require a radiation dose over 10 times higher than ICRP recommends as safe for screening. Innovative 3D-CBS technology can capture simultaneously and accurately maximum signals from tumor markers from all organs to identify the smallest anomaly, at lower cost per signal captured, requiring minimum radiation. Increased efficiency and lower cost are obtained by the interrelation of inventions in physics, geometry, data-flow, system architecture, electronics, detector assembly, etc. This workshop, designed to stimulate discussion, provides an ideal opportunity to understand these complex interrelations and details of this invention through an oral presentation with answers to audience questions. Innovations enable the construction of a cost-effective 3D-CBS device (www.crosettofoundation.org/uploads/336.pdf) with longer FOV, using economical crystals capable of accurate measurement of, a) total photon energy by weighting signals from 9 electronic channels, not current PET's 4; b) photon arrival time (TOF); c) spatial resolution of incident photons in the crystal: "x, y" coordinates and DOI; d) signal-to-noise ratio, possible because of capability to execute complex algorithms in real-time, sustaining high input data rate. Higher efficiency and more accurate measurements allow early diagnosis of cancer with reduction of false positives and false negatives at a lower examination cost.

The above abstract has been translated in the following languages.

Chinese (www.crosettofoundation.org/uploads/357.it.pdf);

Dutch (www.crosettofoundation.org/uploads/359.it.pdf);

English (www.crosettofoundation.org/uploads/339.it.pdf);

French (www.crosettofoundation.org/uploads/341.it.pdf);

German (www.crosettofoundation.org/uploads/343.it.pdf);

Italian (www.crosettofoundation.org/uploads/340.it.pdf);

Japanese (www.crosettofoundation.org/uploads/358.it.pdf);

Portuguese (www.crosettofoundation.org/uploads/345.it.pdf);

Russian (www.crosettofoundation.org/uploads/370.it.pdf);

Spanish (www.crosettofoundation.org/uploads/342.it.pdf);

The *author's biography translated in the following languages may be found at:*

English (www.crosettofoundation.org/uploads/354.pdf);

French (www.crosettofoundation.org/uploads/356.pdf);

German (www.crosettofoundation.org/uploads/355.pdf);

Italian (www.crosettofoundation.org/uploads/354.it.pdf);

Portuguese (www.crosettofoundation.org/uploads/355.it.pdf);

Spanish (www.crosettofoundation.org/uploads/356.it.pdf);

To allow the reader to understand in more detail the 3D-CBS innovative technology, the latest article by Crosetto accepted for publication is reproduced here with one additional figure and one table to facilitate comprehension. This article available at: http://villaolmo.mib.infn.it/icatpp11th_2009/accepted/radiotherapy%20and%20medicalinstrumentations/crosetto.pdf, was accepted for publication on December 2, 2009, in "Astroparticle, particle and space physics, detectors and medical applications." Editor: World Scientific, 2010.

FUNDING 3D-CBS: CHANGING THE ROLE OF PET FOR CANCER SCREENING

DARIO B. CROSETTO

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The role of Positron Emission Technology (PET) should be changed with use of the 3D-CBS (Three Dimensional Complete Body screening) for maximizing the capture of signals that will detect minimum abnormal metabolism (or other biological processes), achievable by capturing simultaneously and accurately as many signals as possible from the tumor markers from all organs of the body in order to identify the smallest anomaly, at the lowest cost per signal captured and requiring the minimum radiation to the patient. This paper provides scientific arguments for setting new parameters for industry to establish the correct relation between the goal of obtaining substantial reduction in cancer deaths and the implementation of innovations and technology that will provide the expected results through early cancer detection.

1. Introduction - Facts & Figures - dimensions of the problem

In the 38 industrialized countries, [1] identified as those with "Very High Human Development" with a total population of 989 million,

the total cost for cancer is $741 billion/year.

This cost, calculated as the total cost for cancer[17] in the U.S. in 2008 is $228.1 billion, divided by the population as of July 1st, 2008 of 304 million [2],

equals $750/per-capita annually.

Despite such high costs, every year among this population of 989 million of the most industrialized countries[18], cancer takes the highest toll of

one million premature deaths per year
just in the group 50-75 years of age,

more than any other disease, war or other calamity [3].

[17] $228.1 billion total, split as $93.2 billion for direct medical costs (total of all health expenditures); $18.8 billion for indirect morbidity costs (cost of lost productivity due to illness); and $116.1 billion for indirect mortality costs (cost of lost productivity due to premature death).

[18] The 38 most industrialized countries listed by the Human Development Index (HDI) are: 1. Norway, 2. Australia, 3. Iceland, 4. Canada, 5. Ireland, 6. The Netherlands, 7. Sweden, 8. France, 9. Switzerland, 10. Japan, 11. Luxemburg, 12. Finland, 13. United States, 14. Austria, 15. Spain, 16. Denmark, 17. Belgium, 18. Italy, 19. Liechtenstein, 20. New Zealand, 21. United Kingdom, 22. Germany, 23.Singapore, 24. Hong Kong, 25. Greece, 26. South Korea, 27. Israel, 28. Andorra, 29. Slovenia, 30. Brunei, 31. Kuwait, 32. Cyprus, 33. Qatar, 34. Portugal, 35. United Arab Emirates, 36. Czech Republic, 37. Barbados, 38. Malta

The $93.2 billion direct medical expenditures for cancer in the U.S. in 2008 [2] were about 100 times those of 50 years before (in 1963 only $1.2 billion [4]), while the increase in cost of living was ***only 3 times***.

> ***During the past 50 years reduction in cancer death has been recorded as a mere 5%*** [5], while for heart disease the reduction was 64%.

That ***the direction in cancer research needs to be changed*** *to make it more efficacious* is proven because the **reduction of cancer deaths is not *much different in less developed countries.***

In 1993 a major scientific review of a breakthrough technology invented by the author, the basis for a substantial reduction in premature cancer deaths that would already have been achieved if funded, ***was recognized valuable by an international review panel of scientists*** from major research centers (FERMIlab, CERN, etc.), the most prestigious universities (Chicago, Michigan, Irvine, etc.) and leading industry (DEC). In one month in 1992, the innovation was presented at three international conferences in Europe and the U.S. and two of the author's articles were published in peer reviewed scientific journal *Nucl. Instr.*[6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22]. Surprisingly, 17 years after the invention was recognized and approved, and during the past 12 years when the author submitted proposals to implement ALL his inventions related to medical imaging for early cancer detection, no funds were awarded.

> ***Had a mere 0.0002% of those $8 trillion [23] cancer cost incurred during the past 12 years been diverted to such an award, it would have resulted in over 33% reduction in premature cancer deaths instead of the 2% realized.*** (See details at: www.crosettofoundation.org/uploads/330.pdf)

2. What is Cancer, how is it manifested and how can it be defeated?

Cancer is a disease characterized by the **mutation of normal body cells** into cancerous cells whose main characteristic is out of control reproduction, and transported through the blood stream to other distant tissues (metastasis).

Experimental data [24] confirm that **cancer diagnosed at an early stage, at the development of the very first cancerous cells, has 90% to 98% probability of resulting in a life saved**. Development of cancerous cells can be associated with **signals *related to changes in: odor, temperature, tissue density, fluorescence, metabolism, perfusion, etc.*** Among all these signals, the ones most reliable and useful for early detection are those showing change in metabolism (up to 70 times higher in cancerous cells) and other biological processes at the molecular level, even before symptoms or morphological changes occur (e.g. change in tissue density that will be detected at a later

stage by mammogram, X-rays, CT, MRI, Ultrasound, etc.).

3. Limits of current PET overcome by the 3D-CBS invention

Due to their low efficiency, the current over 5,000 Positron Emission Tomography (PET) devices cannot provide early detection because they capture and inaccurately measure only one signal out of 10,000 from the tumor markers. Current PET examinations are costly and require a radiation dose over ten times higher than the level recommended by ICRP as safe for screening).

The innovative 3D-CBS technology can capture and accurately measure 1 out of 25 signals from the tumor marker (400 times efficiency improvement) ***allowing achievement of true safe early detection, cost effectively.*** **This will change the current role of PET** from that of measuring the dimension of tumors mainly detected at an advanced stage using other procedures, with the limited goal of helping the physician with prognosis and justification for the use of expensive treatments that in most cases will not save lives, to that of a safe screening device for efficacious early detection of the start of cancer development in asymptomatic patients at high risk (or the restart of activity in cancer survivors). It is this early detection that has been shown to save lives.

3.1. *Basic invention of 1992 relative to the increase in efficiency*

The basic invention in 1992 of the 3D-Flow [11, 15] parallel-processing system (Figure 1) made possible execution of complex real-time algorithms for a time longer than the time interval between two consecutive input data with the capability of neighboring data correlation with no boundary. This provides the advantage of full utilization of all the radiation – nothing is lost.

The solution is much more critical for Medical Imaging than for Particle Physics. In Particle Physics, inefficiency only causes a delay and higher cost in discovering new particles. Much more serious and damaging, inefficiency in Medical Imaging devices increases the cost for health care**,** and also requires administering a higher radiation dose, dangerous to the patient, does not provide the necessary sensitivity to diagnose cancer at an early stage, and is not accurate enough to be able to reduce false positives and false negatives**.**

Figure 1 shows data flow at clock 11t and 12t of Table 1.

Table 1 shows the sequence of the packages of data in different times in one 3D-Flow electronic channel. A package of data contains information received at a given time from a "detector channel" of the 3D-CBS (Three-Dimensional Complete Body Screening) detector.

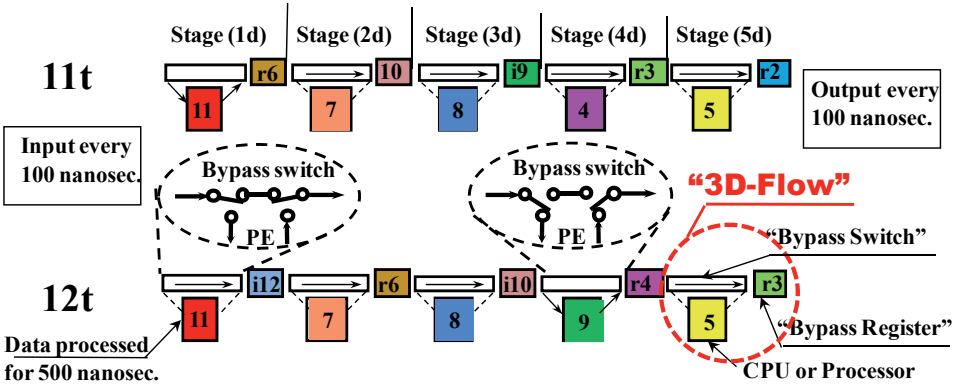

Figure 1 The figure shows the flow of data during two clock cycles in an electronic channel of the 3D-Flow parallel-processing system that, at each clock, acquires a data package in input and provides a result at output, allowing each processor the number of clocks necessary to execute the entire algorithm, which is equal to the number of processors of the chain times the number of clocks. In the event the input data rate increases, or it is necessary to execute a more complex algorithm requiring more time, the problem can be solved by increasing the number of stages in the chain.

Table 1 Sequence of data packages in a 3D-Flow electronic channel.

Clock	Stage (1d)		Stage (2d)		Stage (3d)		Stage (4d)		Stage (5d)	
	Proc. (1d)	Reg. (1d)	Proc. (2d)	Reg. (2d)	Proc. (3d)	Reg. (3d)	Proc. (4d)	Reg. (4d)	Proc. (5d)	Reg. (5d)
1t	1									
2t	1	i2								
3t	1	i3	2							
4t	1	i4	2	i3						
5t	1	i5	2	i4	3					
6t	6	r1	2	i5	3	i4				
7t	6	i7	2	r1	3	i5	4			
8t	6	i8	7	r2	3	r1	4	i5		
9t	6	i9	7	i8	3	r2	4	r1	5	
10t	6	i10	7	i9	8	r3	4	r2	5	r1
11t	11	r6	7	i10	8	i9	4	r3	5	r2
12t	11	i12	7	r6	8	i10	9	r4	5	r3

One should note that data-package No. 1 stays in the first processor of the first stage for five cycles, while four data-packages (i2, i3, i4 and i5) are passed forward (via the "bypass switch") to the next stage.

For example at clock 6t, while station 1d receives data-package No. 6, at the same time, it outputs results r1 relative to the data processed previously. This result "r1" is then transferred to the output of the 3D-Flow system without being processed by other stages.

Each package of input data stays in a 3D-Flow processor for a time equal to about five times the time interval between one data package and the next.

3.2. *Additional inventions related to early cancer detection*

Additional inventions published by the author since 2000 [12, 13, 14, 16, 17] relate to the specific application of the innovation to medical imaging in the areas of physics, mechanics, geometry, data-flow, system architecture, electronics, coupling between detector and electronics, etc.

These inventions allow for a simple system, although the detector length has been increased and more information is extracted using more economical crystals, with

the result of providing at a reasonable cost a much more powerful system not previously envisioned.

The optimized improvements are the right balance between the extension of the Field Of View (FOV), the cost of the crystals, a simplified detector assembly, and novel electronics at lower speed and greater economy.

This second milestone is not merely an invention of a new real-time algorithm or electronics, but several unusual, innovative ideas underlying this system that **require thorough, careful study of the 3D-CBS system as a whole and each of its parts separately**.

One cannot just skim over any part and hope to achieve a comprehensive understanding of a single part, let alone an assessment of the synergy of the entire system.

It is not sufficient to understand the functioning of the 3D-Flow system and of the algorithm, but is necessary to understand their interrelationship, together with their interrelationship with other factors such as technical, economical, etc.

The synergy of all these inventions allows capturing more accurately all possible signals from tumor markers at a lower cost for each signal captured providing the physician more accurate measurements of five parameters that allow early diagnosis of cancer and the reduction of "false positives" and "false negatives" at a lower examination cost. These five parameters are:

1. Accurate measurement of total photon energy, using the signals received from 9 electronic channels (rather than 4 as used in current PET), allows discrimination of "good events" from "scatter events".
2. Accurate measurement of the photon arrival time (TOF) that allows discrimination of "good events" from "randoms" and "multiple" events.

3. Accurate measurement of the spatial resolution referred to the 'x' and 'y' coordinates (distance in the axial and 90° with respect to the axial direction of the impact of the photon into the surface of the crystal. Centroid calcu-lated based on 3x3 array rather than a 2x2 array as used in current PET)
4. Accurate measurement of the photon Depth Of Interaction (DOI) which allows elimination of the parallax error.
5. The improved signal-to-noise ratio makes it possible because of the capability to execute complex algorithms in real-time, while sustaining at the same time a high input data rate.

The new concepts are proven by logical arguments in articles, [7, 11, 12, 13, 15], **by simulation** (Sections 11, 12 of [11], Appendix of [15], Chapter 13 of [12])**, by construction of the innovative parts in working hardware [17] and by experimental results of third parties (i.e. Siemens [25]) confirming the author's claims**.

These accurate measurements allow extraction of a maximum amount of useful information from each photon emitted, providing the **highest possible spatial resolution** and **highest sensitivity** using any type of crystal one chooses. This allows **precise pinpointing of the tumor** (as permitted by the intrinsic limitation of the radioisotope) at its **earliest possible stage**.

Higher efficiency and accuracy of 3D-CBS technology greatly **improves sensitivity and specificity** and reduces false positives and false negatives.

This innovative 3D-CBS technology passed several international scientific reviews extended to world participation in real-time via webcast (2003 in Dallas [19], 2008 in Rome [26]), and was presented recently by the author during over 100 hours presentation/discussion (most are available on video) with professionals at hospitals, universities, research centers (including Nobel Laureates at Erice on August 23, 2008 [22] and at CERN, via web EVO meeting on August 26 2008), to decision makers and citizens at city halls, province meetings with government representatives, cancer organizations, etc.

No professional has provided any valid criticism supported by scientific arguments to invalidate the author's claims. 50,000 scientists affiliated with CERN recently **received the author's key explanation [27] of the fundamental innovation** that had been misinterpreted by a reviewer, sent by cancer patient representatives. No one sustained the reviewer's misinterpretation, nor provided additional objections to invalidate the author's claims.

The anonymous reviewer's misinterpretations were clarified for him at a seminar/discussion by the author on September 24, 2009 at Brookhaven National Laboratory (BNL). Once again, **in a face-to-face discussion, the author was able to overcome a scientist's misinterpretation** which could have lead to a recommendation not to fund the author's innovations. In fact, as **witnessed on the video, scientists at BNL expressed their opinion that the project should be funded [26].**

On September 30, 2009, a forum was held in Pavia with participation of the President of the Association of Medical Physics in Italy and a U.S. scientist via webcast. On that occasion the author proved that the direction of research in the field is incorrect by pointing out that in the article by the Presidents of Medical Physics and Nuclear Medicine [28], which references 184 papers, and describes the traditional PET technology with the limitations in efficiency and cost-effectiveness. For example the attempt to increase PET FOV to 2 meters using RPC, low-efficiency detectors or a crystal thickness 4.5 mm instead of 25 mm, reduces detector sensitivity for a source point in the FOV to 20% from 95%. The author's innovative solution allows instead achieving high efficiency at any point of the FOV at low cost.

The rationale for the claimed reduction in premature cancer deaths of 33% (including tests to be performed to verify the claims) and the 40 times reduction in cost per life saved compared to current costs is described in [21, 23].

Because the Japanese Health Care System in 2005 obtained better results by screening over 50,000 people in 46 hospitals using current inefficient PET/CT [29], compared to results obtained using other devices, surely they will obtain even better results using a device hundreds of times more efficient like 3D-CBS.

The reason why mammogram screening is approved by many countries is because it is claimed to save lives while using a safe radiation dose. PET molecular imaging is much more sensitive than mammography which measures tissue density. 3D-CBS is, in turn, over 400 times more efficient than current 5,000 PET and is suitable for screening examinations because it requires administration of a radiation dose equivalent to mammogram.

It begs the question, "how many more lives could be saved using the 3D-CBS technology?" And a second question: **"How long does it take to open the door to progress and fund the inventor to implement innovations that were recognized and approved as early as 1993 by Fermilab** (and no one has invalidated any of the additional innovations in all this time)**?**

Among the organizers and influential people connected with the workshop is Alberto Del Guerra (Chairman of the session: Prospects in Medical Imaging), who could not participate at the Seminar on the 3D-CBS in Pavia on September 30, 2009, organized by Vincenzo Vigna.

On 6 November 2009, Del Guerra, wrote the following email to Vincenzo Vigna about the 3D-CBS:

----Original Message----
From: alberto.delguerra@df.unipi.it
Date: 11/06/2009 10.51
To: "vincenzovigna@libero.it"<vincenzovigna@libero.it>
Subject: Re: Innovative concepts of the 3D-CBS

Dear Prof. Vigna:

I read the documents you sent me regarding "A few innovative concepts of the PET system proposed by Dario Crosetto."

As I mentioned already, I believe that the proposed pipeline system merits consideration and should be tested on a prototype in order to demonstrate its advantages, in particular at high count rate.

However, regarding the considerations expressed in Figure 2, I am very much in disagreement to the advantages declared for the 3D-CBS technology. In fact, the number of counts in coincidence is proportional to the solid angle and moving from the current 40 cm of axial coverage to proposed (maximum) 2 meters, there will be an increased coverage by a factor of 5.

It is hard for me to understand the basis for the number stated in the first column. If I understand correctly, the proposed system foresees acquiring data in list mode with a software reconstruction of the coincidences.

In that event it is necessary to account for crystal decay time (for the conversion to light) which is currently 30-40 ns (for the fastest LSO, LYSO or LsBr2)

Supposing the use of fast shaping time, it would be possible to get to a minimum of 100 ns.

Therefore the total maximum count rate of "single" is 100 MHz.

At such frequency it is necessary to consider the probabilities of accidental coincidences, but more important, of double coincidences (double x- double y) whose occurrence becomes significant for signal-to-noise estimates.
In current PET, in fact, regions where coincidences are allowed are limited and therefore these problems are proportional to the angles considered.

With my best regards,
alberto del guerra
=== End Del Guerra ========================

Following is Crosetto's response to Del Guerra

=== Crosetto 02/02/2010

Dear Alberto,
I am responding to your comments sent to Vincenzo Vigna on November 6, 2009, after the workshop on the 3D-CBS innovative technology held in Pavia on September 30, 2009. That workshop was organized to fulfill an agreement made to Guido Pedroli during the June 15, 2009 meeting in Pavia and in support of his July 31 indication that he assured you would have an opportunity to meet with me on this subject.

All participants at the September 30, 2009 meeting were sorry that you could not participate and have expressed their availability to participate in another meeting that was to be set before my departure from Italy on October 25, 2009. However, again, you could not participate, therefore we continue with this correspondence open to everyone.

Reading your email to Vigna, I was pleased to realize that, contrary to what you expressed in your review of my technical-scientific book published in June 2000, now

you recognize the merit of my invention of the 3D-Flow parallel-processing architecture.

I was disappointed, however, to read that you now strongly disagree with the advantages of my innovative 3D-CBS technology.

As with you, my innovations and their advantages have often been misinterpreted. I have provided clarification each time so that their value would be recognized, although those misinterpretations have delayed the benefits of application to the patient.

Therefore, I submitted a request to be able to present a synthesis of my innovations at the workshop on Physics for Health in Europe on February 2-4, 2010 at CERN because you are among the organizers as well as being the Chairman of the "Medical Imaging" Section, so that I would have the possibility to directly explain possible doubts or misinterpretations that continue to be repeated, (as I will report later) causing the blocking of funding and of the acceptance of articles by some peer reviewers.

I regret that you and the other organizers do not want my innovation and its advantages to be presented.

For example, if it took ten years for you to understand that what you described in your three articles cited in your August 2000 review of my book did not have any bearing on my basic invention of 1992, one should ask how many more years will it take to understand all my other innovations of Figure 2 (http://www.crosettofoundation.com/uploads/254.pdf) if I do not have the possibility to present it to the workshop and answer doubts and misinterpretations.

Your comments were not clear to me. In the event they would be comprehensible to the other participants of the September 30, 2009 meeting in Pavia, I would be pleased if clarifications would be provided. For example, it is not clear why you mention the increase in coverage by a factor of 5. The relationship you make between the decay-shaping time of 100 ns and the count rate of 100 MHz is not clear. (This was partially clarified by your "ERRATA CORRIGE" sent to the group on January 18, 2010)

In order to clarify our communication as much as possible, I will answer point-to-point each paragraph of your email, providing the logical steps and references that may be familiar to you, but certainly are not to everybody, in order to allow participants of the September 30, 2009 meeting to understand the substance of my answers. In the event I miss some reference or logical step, kindly point it out to me and I will do my best to improve my description.

=== End Crosetto ======================

=== Del Guerra 06/11/2009

"In fact, the number of counts in coincidence is proportional to the solid angle and moving from the current 40 cm of axial coverage to proposed (maximum) 2 meters, there will be an increased coverage by a factor of 5."

=== End Del Guerra ==========

=== Crosetto 02/02/2010

First of all it is necessary to understand why you wrote about an increased axial coverage by a factor of 5 without mentioning the increase in efficiency. Would this mean an increase in efficiency of only a factor of 5? I am puzzled why you refer to a FOV of 40 cm, while, as far as I know, the over 5,000 current PET have only a detector length of 16 cm. In the event you are aware of the existence of many PET with a 40 cm FOV, please let me know where they are.

Second I would like to underline that the number of pairs of photons captured (counts in coincidence) increase proportionally to the square of the increase in length, according to a simple demonstration reported in the figure at the website www.crosettofoundation.org/uploads/349.pdf.

With regard to my claimed increase in efficiency by 400 times, first of all "efficiency" is defined as the number of pairs of photons captured divided by the number of pairs of photons emitted by the radioisotope inside the patient during a unit of time.

In support of my claim of the increase in efficiency by over 400 times, I provide the following arguments:

1. Figure 3-4 at page 23 of the book "400+ times improved PET efficiency for, lower-dose radiation, lower-cost cancer screening" and its associated text at pages 15-23. www.crosettofoundation.org/uploads/336.pdf
2. Bibliographical references (17, 167, 168, 173, 174, 175, 176) supporting the photon counts for different detector lengths. One can note that graphs of Figure 3-4 reflect the values of the results of the simulations by Los Alamos, Badawi, Tumay Tumer, etc.
3. I have asked physicist Luciano Ramello to verify the values of the graphs of Figure 3-4 at page 23 of the book mentioned before. His report is available at www.crosettofoundation.org/uploads/350.pdf.

=== End Crosetto ==========

=== Del Guerra 06/11/2009

"It is hard for me to understand the basis for the number stated in the first column. If I understand correctly, the proposed system foresees acquiring data in list mode with a software reconstruction of the coincidences."

==== End Del Guerra ====================

=== Crosetto 02/02/2010

To which numbers do you refer in the first column? I do not see numbers in the first column of Figure 2.

If I understand correctly what you mean by "list mode" according to what you wrote in your 1993 article you have cited (www.crosettofoundation.org/uploads/346.pdf) is a system that works in two steps: during the first step it captures the data into memory and in the second step it processes them off-line (not in real-time) via software. My system works exactly the opposite to the "list mode" analyzing data in real-time at the maximum data rate that was chosen to work in continuous mode, for an indefinite time, independent from the memory size, without missing any input data. Perhaps this big misinterpretation is a point that did not allow understanding the value of the advantages of my system.

=== End Crosetto ======================

=== Del Guerra 06/11/2009

In that event it is necessary to account for crystal decay time (for the conversion to light) which is currently 30-40 ns (for the fastest LSO, LYSO or LsBr2).
Supposing the use of fast shaping time, it would be possible to get to a minimum of 100 ns. Therefore the total maximum count rate of "single" is 100 MHz.
At such frequency it is necessary to consider the probabilities of accidental coincidences, but more important, of double coincidences (double x- double y) whose occurrence becomes significant for signal-to-noise estimates.
In current PET, in fact, regions where coincidences are allowed are limited and therefore these problems are proportional to the angles considered.

From: Alberto Del Guerra [mailto:alberto.delguerra@df.unipi.it]
Sent: Monday, January 18, 2010 5:47 AM
To: Vincenzo VIGNA
Cc: c.aprile; guido.pedroli; guido.pedroli;

domenico.scannicchio; zontaris; werbrouk; ws; alberto.calligaro; prorettore.vicario; carloalberto.redi; franco.gaspari; barbara.grigoletto; ruben.sonnino; Vittorio.remondino; fglinac; ratti; crosetto@worldnet.att.net; info@crosettofoundation.com
Subject: Re: Concetti innovativi del 3D-CBS.

Dear prof vigna,
in my first answer there was a typo error. Where it was written:

Supposing the use of fast shaping time, it would be possible to get to a minimum of 100 ns, [ERRATA]

should be corrected as:

Supposing the use of fast shaping time, it would be possible to get to a minimum of 10 ns, [CORRIGE]

I apologize for the error and for the successive propagation of the error

alberto del guerra
=== End Del Guerra ======================

=== Crosetto 02/02/2010

I Note at this point your ERRATA CORRIGE, however, this issue still needs to be clarified by you. Perhaps there is confusion between the area of the signal that is related to the crystal decay time (for the conversion to light which is related to the photon's energy) and the rising edge of the signal (characteristic measured to extract photon's arrival time) which is the information used to eliminate double x – double y (considering also the difference of the photon's travel time to the crystals on opposite side of the detector after annihilation).

"The total maximum count rate of "single" [of] 100 MHz" that you are referring to in your email is proportional to the radiation dose injected into the patient and not to the crystal decay. Because the 3D-CBS is hundreds of times more efficient than current PET it requires administering 1/30 of the radiation dose used by current PET so singles that hit the detector will be fewer, giving less chance to generate

double x and double y. Furthermore, the parameter that is necessary to measure accurately in order to eliminate double coincidences is photon's arrival time which is related to signal rising edge, which can reach resolutions faster than 1 ns for TOF-PET. For this reason I ask you to explain why you write about a relation between crystal decay time and double coincidences.

Your data are not clear to me. In the event it would be clear to other people of the group, please provide a detailed explanation.

In regard to the "signal-to-noise" that you mentioned, one should not focus only on the idea that it is going to improve only by using faster crystals (that according to your claim allow to reduce double coincidences), because in reality signal-to-noise is related to many factors and not only to the crystal, but mainly by making more accurate measurements of several parameters (energy, arrival time, x, y, z coordinates of the point where the photon is absorbed in the crystal) which can be achieved even when using slow, economical crystals.

It is difficult for me to understand the logic in your statements in your last sentence **"In current PET, in fact, regions where coincidences are allowed are limited and therefore these problems are proportional to the angles considered."**

Instead it is logical to increase the efficiency of the device in order to reduce the radiation dose administered to the patient, and capture simultaneously many photons that will show minimum abnormal metabolism. This can be achieved by increasing the solid angle and not decreasing it in order to reduce the double coincidences. The problem of the double coincidences must be solved with more accurate measurements, not by throwing away radiation using a shorter detector and a smaller solid angle.

It seems instead that the reasoning supporting your statement in the previous paragraph is that of increasing the radiation to the patient (this becomes necessary in order to have a reliable statistic), reduce the solid angle, reduce regions where double coincidences could be captured, wasting in this way the radiation emitted from area of the body that are not covered by the detector. This is equivalent to saying that instead of improving technology, the electronics, the possibility to separate good signals from noise with the execution of complex algorithms, one should limit the area (Field of View) and the number of signals, perhaps in order not to saturate the electronics which do not have the capability to analyze all signals received.

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In addition to the point-to-point response to your email, it is necessary to address what is more important, which is analyzing my inventions that satisfy the objective of a substantial reduction of cancer deaths when the role of PET is changed. Instead, if the baseline is current PET and reviewers want my 3D-CBS project to be limited, conforming to the role of current PET, then there will never be room for innovation, for progress, for a change in the role of current PET. There will be no room for comprehension of my innovations if the need for improvement is not understood beforehand, as you also manifested in your review of my book in 2000 when you wrote these very precise words:
=== End Crosetto ======================

=== Del Guerra August/2000, from his review of Crosetto's book

"…What I am saying is that for many clinical investigations the amount of radioactivity (a lot) that is not in the field of view of the actual PET cameras does not give any additional clinical information. A special case could be the whole body PET for tumor and metastasis search, but in that case, I would assume that the amount of radioactivity taken by the patient is not issue, being patients at great risk. In conclusion I do not think that is fair to say that the increase in count rate by means of increase in detection area and solid angle coverage is directly proportional to the clinical capability of the system!"
=== End Del Guerra ======================

=== Crosetto 02/02/2010
If my objective is that of capturing as many photons as possible at a minimum cost per photon captured and you do not believe it necessary, we should discuss this issue first because otherwise all that I propose, in your opinion, would be unnecessary and without value.

By the same token, it is necessary to discuss what improvements need to be made to PET. I assume that it is the increase in efficiency: "the ratio between the number of valid signals (true) captured, divided by the number of valid signals (true) emitted, measuring with great accuracy all characteristics of the captured photons".

Based on what you have written, it seems that you do not agree with this goal and give more importance only to one measurement which is "spatial resolution", although the principle of operation of PET is based on measuring dynamic activity during a period of time: the nutrient consumption, blood flow, perfusion, etc.

The real problem that should be addressed at the workshop on February 2-4, 2010 at

CERN, since among the participants are listed researchers from Siemens and other corporations, is the problem raised by the President of Nuclear Medicine and Medical Physics of Italy published in issue, "Anno V, N. 2, May 2009 pp. 26-68" to which I provided a point-to-point answer (www.crosettofoundation.org/uploads/288.pdf). More specifically we should address the future of Medical Imaging, Molecular Imaging, and PET outlined in that article where the Presidents of the mentioned organizations state that large corporations (such as Siemens for whom they cited several articles about their R&D) are moving toward increasing the length of the Field of View (FOV) of PET up to 2 meters, however, using detectors with efficiency lower than 20% (for example RPC, crystals with 4 mm in thickness, etc.). In reality, this approach worsens performance of current PET in the feature that identifies micro-nodules and worsens early detection. Instead, it is functional only to perform more examinations in a given time, thus achieving only greater profit. My solution instead foresees an increase of the FOV keeping at the same time crystal efficiency higher then 95%, increasing the overall efficiency by over 400 times, allowing more accurate measurements of the characteristics of photons in time coincidence even when slow, economical crystals are used.

Another issue that needs to be clarified and most likely would have been if you had attended the meeting in Pavia on September 30, 2009, involves the point of view of the President of the Medical Physics Association in Italy, Guido Pedroli (one of the authors of the article published on May 2009 in the Magazine "Notiziario della Medicina Nucleare) who agreed with and recognized the value of my innovative electronics for the 3D-CBS. He was strongly against my suggestion to use BGO crystals because, in his opinion, they provide signals that are not consistent in time ("ballerini" –dancing photons- as witnessed in the video recording, meaning that although the circumstances do not change, the signals, for no reason, in his opinion, one time are high and next time are low). To no avail, I argued that the General Electric PET is based on BGO, that more than half of existing PET in the world use BGO, that my 3D-Flow parallel processing architecture can extract more information from any crystals, including the BGO, and improve its performance. In conclusion, Guido Pedroli rejected my approach because I suggested the use of BGO and he said in the video that **YOU** are the expert who can explain why it should not be used. Therefore, I am expecting also a clarification from you on this issue.

Focusing on multimodality as indicated by the choice of most of the talks for the CERN workshop, does not help to reduce premature cancer deaths if among these there is not one modality that is efficacious and cost-efficient for early cancer detection (PET technology at the molecular level is the best candidate, recognized by everyone because it allows analysis of anomalous cancerous biological processes even before a tissue morphological change occurs, when CT, MRI, Ultrasound, etc. cannot detect them).

Essentially, we should ask ourselves how it is possible to measure photon's energy more accurately (for sure, the sum of 9 elements is better than 4), how can photon arrival

time be improved, how can the spatial resolution be improved by accurately measuring x, y, z coordinates relative to the point where the photon is absorbed in the crystal, and how can the signal-to-noise ratio be improved. For each of these parameters it is necessary to discuss and compare different solutions, underlining not only better accuracy, but also cost reduction.

With the 3D-CBS project, I implemented these improvements for measuring those parameters and have illustrated them in Figure 2. If you disagree with Figure 2, you must be more specific in which section: in summing 9 electronic channels instead of 4 for measuring photon's energy? In the detector assembly, different from the current "block detector, etc.?

These are the important aspects that can make a great impact on the reduction of cancer deaths through implementation of early cancer detection at low examination cost and high efficiency.

Once it have been identified these basic technical aspects that are essential for actuating a shift in cancer research, it is necessary to identify the innovations with more merits, targeted to the improvement of such fundamental aspects that are more useful to the patient.

The objective to identify all innovations with greater merit and more useful to the patient is achieved only if a true "peer review" process is established in which each expert in this field, according to an ethical and professional standards should discuss with his colleagues, referring to precise scientific arguments. The result is that this process will make the best solution stand out that can measure up to verification by many experts and whose claims cannot be refuted.

Therefore, the key elements for science to effectively contribute to Health are two:

1. Directors, Chairmen of Conferences and Workshops and people responsible for the major research centers in the world in different disciplines related to reducing cancer deaths, must nominate experts and decision makers who plan the future of cancer research and services, facilities, etc. in health care, to engage in discussion with project proposers (or Principal Investigators).

2. These nominated experts will discuss with the Principal Investigators (PI) of research for solutions targeted to reduce cancer deaths at a lower cost (estimated results of their research must be provided in their proposals) and follow a fair peer review procedure described previously, whose goal is to make stand out and promote solutions that best comply with the law of nature and the interest of the patient

In this specific case, in order to make the best solution for early cancer detection at the molecular level stand out, what is important is to ask ourselves how it is possible to capture more accurately more pairs of photons in time coincidence at a lower cost per photon captured.

In light of your statements expressed during the review of my technical-scientific book of 2000, one should not be surprised that you are "very much in disagreement" about the advantages of my technology because, based on your statement:

=== Del Guerra August/2000, from his review of Crosetto's book

"…is not in the field of view of the actual PET cameras does not give any additional clinical information. …I do not think that is fair to say that the increase in count rate by means of increase in detection area and solid angle coverage is directly proportional to the clinical capability of the system!,"

not only do you not see as useful the advantages I propose, but also it seems that you do not believe it is necessary to INCREASE PET FOV and INCREASE COUNT RATE, which is improving efficiency, and it seem you do not want it, no matter who proposes it, independent of any approach.

It would have been important to discuss this issue (as well as others) in a face-to-face meeting with the President of the Medical Physics Association, Guido Pedroli as he suggested during our first meeting on June 15, 2009. I, other participants and even you agreed, but you never provided a date to meet, alternate to a date in the summer of 2009 or before October 25, 2009 when you communicated that you could not attend even via conference call at the meeting on September 30, 2009. Without this face-to-face discussion, given the fact that we are dealing with innovations, the risk is that they will continue to be misinterpreted as has often occurred in the past. Furthermore, even before discussing my innovations, because it is clear from the numerous citations made by Pedroli and Salvo article in May 2009 (www.crosettofoundation.org/uploads/288.pdf) of research work by industry and university that confirm the trend expressed also in your above statement. It is extremely urgent we address your statements, the other research work and trends about the future direction of the research in this field during this workshop.

After having assessed that it is necessary for an improvement in efficiency at a lower cost per photon captured, the logical next step is to analyze how my innovations were misinterpreted on many occasions.

In this regard, I list a few examples of such misinterpretations that prove the need for my presentation to the scientific community as could have occurred at the CERN workshop, to clarify all doubts that still exist after 17 years, that make it difficult for a full and in depth recognition of the advantages of my innovations.

1. The dialogue with senior scientist Les Rogers, who, after the IEEE-NSS-MIC Conference in Lyon, France in 2000, was appointed by the IEEE leader Aaron Brill, to look in depth into my innovative 3D-CBS technology. The email exchange between Les Rogers and me shows that Rogers progressively reached an understanding of my innovation opposite to his first impression described in one of his first emails. In fact, thanks to this direct discussion, at the end one can see in Rogers' email that he agreed that my innovations had value and my claims were correct and irrefutable (later I proved it all in hardware).(http://www.3d-computing.com/nss99review/summary_nss99.htm)

2. Another misinterpretation of my innovation and inventions is found in your two page review (dated August 2000) of my June 2000 book where you misinterpreted my innovation, not recognizing its merit to the point of writing:

=== Del Guerra August/2000, from his review of Crosetto's book
"As a matter of fact we proposed a similar approach for x-ray imaging, originally based on transputers (M.Conti, A. Del guerra et al, "*A transputer-based list mode parallel system for digital radiography with 2-D silicon detectors*"IEEETrans. Nucl.Sci. vol.40(4), 1993 , pp.996-1000). It is worth noting that in this paper on transputers (1993) we also said:

"..We believe that this type of parallel configuration could be applied not only to any 2-D detector where the X and Y coordinates are read independently, but also to Positron Emission Tomography (PET) where a temporal coincidence must be done between the two annihilation photons. In this latter case the problem topology, although more complicated, can be easily mapped on a transputer-based architecture. We are currently considering this possibility"…

This eventually came up with a paper (that was rejected by Physics in Medicine and Biology) and one experimental thesis in Physics.
Then we implemented the same idea on a dedicated VLSI system (A.Del Guerra et al. "A high rate X-Y coincidence VLSI system for 2-D imaging detectors" Nucl.Instr. Meth A394, 1997, pp.191-198) for x-ray imaging in mammography."

=== Crosetto 02/02/2010

Now, after ten years, you have recognized its merit. I photocopied the articles you cited in you review of my book, scanned them and posted them on the web to facilitate easy electronic access for those who do not have access to such old documents available only in scientific libraries such as the Southern Methodist University library in Dallas, TX. Your article is available at: www.crosettofoundation.org/uploads/346.it.pdf.

There is absolutely no relationship between the two concepts, not the slightest similitude between my 3D-Flow innovative architecture and the approach you describe in your article. Yours is one of many Transputer applications that uses one processor I/O port to connect to the processor on its right and one to the processor on its left. My system has connections in six directions, with the capability of data exchange with adjacent processors in one plane. It utilizes a unique concept of bypass register and bypass switch. These are the key features providing functionality in the third dimension. Your system cannot exchange data with adjacent processors in four directions, cannot execute complex algorithms and at the same time sustain a high input data rate without missing any of them.

The second article you cited in your review of my book is available at www.crosettofoundation.org/uploads/347.it.pdf and also refers to an application very different from my 3D-Flow architecture.

In your two page review, you mention a third reference that is available at www.crosettofoundation.org/uploads/348.it.pdf citing on page 39 of my technical-scientific book, mid paragraph:

=== Del Guerra August/2000, from his review of Crosetto's book

"….The detector therefore has no energy resolution….
This is entirely correct. Just a comment: the detector has intrinsic energy discrimination. In the prototype by Jeavons at about 150-200 keV, thus reducing the Compton scatter contribution from the body.
(please see also: A. Del Guerra et al. 3-D PET with MWPC's: Preliminary tests with the Hispet prototype", Nucl instr Met. A269, 1988, pp425-429)

=== Crosetto 02/02/2010

I am pleased that you agree and find this statement in my book to be correct. However, if you agree that MWPC's do not provide energy information and have

low efficiency, I am puzzled why you consider MWPC detectors as candidates for PET. The health of the patient should come first and therefore we should provide efficient tools, and not envision tools that have low efficiency and do not provide energy information.

3. Other reviewers of my grant proposals have misinterpreted my 1992 innovation comparing it with a hypercube.

4. Another review that reached the point of deadlock was the one that followed my presentation at the series of Seminars on "Planetary Emergencies" in Erice,Italy on august 23, 2008 also before Nobel Laureates in Physics. My presentation triggered a lively discussion among the audience, followed with several pages of email exchange with the reviewer Richard Garwin who was appointed by Antonino Zichichi after an earlier meeting on March 2008 with former CERN Scientific Director Horst Wenninger and the expert on detectors and TOF Crispin Williams. Also in this case, the discussion (followed by correspondence to several other scientists) ended with a statement by Richard Garwin that he was incompetent in the specific subject matter (although at the beginning of the email exchange he stated the contrary). Details of this discussion are available at www.crosettofoundation.org/uploads/217.pdf and www.crosettofoundation.org/uploads/233.pdf

5. One additional disheartening refusal to consider the invention that would have already saved many lives came from the CPRIT funding agency in Texas that first stated to be interested in solutions that would reduce cancer deaths (as stated by his executive Director in a letter to me dated September 23, 2009) www.crosettofoundation.org/uploads/318.pdf). They also asked for comments when finalizing their rules as I provided on September 26, 2009 in www.crosettofoundation.org/uploads/320.pdf. They thanked me for comments submitted, saying they were very valuable and in agreement with the CPRIT mission of reducing cancer deaths at a lower cost per life saved compared to current costs. The CPRIT Executive Director encouraged me to submit a proposal, which I did. However, the Scientific Oversight Committee evidently did not have the same mission in mind, because based on the title of my proposal (and similarly for 478 other proposals) they triaged it out of further consideration (meaning that my goal was not interesting to them) without even looking at my 10 page research plan (CPRIT's Request For Application rules stated very clearly that reviewers would not look at the research plan during the first phase). You may wonder at this point what goal I stated in the title. It is: "3D Complete Body Screening (3D - CBS) for Early Cancer Detection Targeted to Reduce Premature Cancer Deaths at a Lower Cost per Life Saved Compared to Current Cost". This clearly indicates that the Scientific

Oversight Committee had a different mission than stated publicly and by the Executive Director and that they are not interested in even in looking for any solution that reduces cancer deaths at a lower cost per life saved. (see documentation at www.crosettofoundation.org/uploads/372.pdf)

6. Recently, an anonymous reviewer appointed in August 2009 by Brookhaven National Laboratory Associate Director, Ralph James wrote: "It looks like this is a FIFO-kind approach with an extra processor added to each memory register." My answer to the reviewer's comment was,: "Your anonymous reviewer seems not to have grasped the function of the "bypass switch" described in the figure (and other details presented in my publications). No, it is not even close to a FIFO. By even suggesting that a FIFO is "asynchronous" (de-randomizing), while my system is "synchronous" (allowing execution of complex real-time algorithms, while coping with high input data rate). It has been difficult for all these years to try to get the attention of decision makers who are very busy and do not have the time to study all innovations. So, with patience, I just want to make others, like Ralph James, aware of the importance of this problem of recognizing and supporting innovations that can greatly benefit cancer patients. I have been polite (as Ralph says) in telling him and others that cancer issue should be moved up in priority. I said this without annoying or being rude to decision makers that would not make time to listen to innovations. So, I was pleased to hear Ralph's words on the phone in January 2010 when he said it has been a pleasure knowing me, that I am: "…such a gentleman to everyone". However, now is the time for decision makers to act as gentlemen, not just to me but to all cancer patients and provide the answer to us all that we rightly and legitimately expect from such decision makers to know why innovations of benefit to cancer patients that could have been recognized and funded decades ago why this continues to be delayed!

Each of these occurrences points out the urgent need to resolve such misinterpretations through a presentation to the scientific community, to clarify all doubts that still exist after 17 years, that make it difficult for full and in depth recognition of the advantages of my innovations.

As stated before, the two important tasks that will bring advances are:

1. Directors of Research Centers and Decision Makers should nominate experts in each field
2. CERN should organize meetings where these experts and solution proposers will meet to carry on a peer review process, as described in this document, with point-to-point answers provided by each party to the point that answers supported by the strongest scientific arguments will prevail

In summary until doubts held by leaders of the scientific community are addressed openly and publicly as could occur at CERN on February 2-4, 2010, such innovations will continue to not be fully understood and not funded. These are innovations that could already have provided benefits to mankind if the possibility to implement ALL my innovations at once in a series of complete prototypes in which the greater efficiency calculated could be verified in a statistical meaningful clinical trial had been provided to me.

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