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(71) Applicants (for all designated States except US):

DUBLIN CITY UNIVERSITY [IE/IE]; Collins Avenue, Dublin, Dublin 9 (IE). **ROYAL COLLEGE OF SURGEONS IN IRELAND** [IE/IE]; 123 St. Stephens Green, Dublin, Dublin 2 (IE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KENT - KAYLE, Nigel** [IE/IE]; Foulksmills, Wexford (IE). **LINCOLN, Bryan** [US/US]; 25 Sunvalley Drive, Cumberland, Rhode Island RI 02864 (US). **BASABE-DESMONTS, Lourdes** [ES/IE]; 27 Deans Court, Back Lane, Christchurch, Dublin, Dublin 16 (IE). **RICCO, Antonio** [US/US]; 101

Bacigalupi Drive, Los Gatos, California CA 95032 (US). **KENNY, Dermot** [IE/IE]; Inishowen, 98A Marlborough Road, Dublin, Dublin 4 (IE). **MEADE, Gerardene** [IE/IE]; South Shore Road, Corner of Crescent Road, Rush (IE). **CORCORAN, Brian** [IE/IE]; 10 Beech Drive, Dundrum, Dublin (IE).

(74) Agent: **MURGITROYD & COMPANY**; Scotland House, 165-169 Scotland Street, Glasgow Strathclyde G5 8PL (GB).

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[Continued on next page]

(54) Title: MICROFLUIDIC DEVICE FOR ASSESSING OBJECT / TEST MATERIAL INTERACTIONS

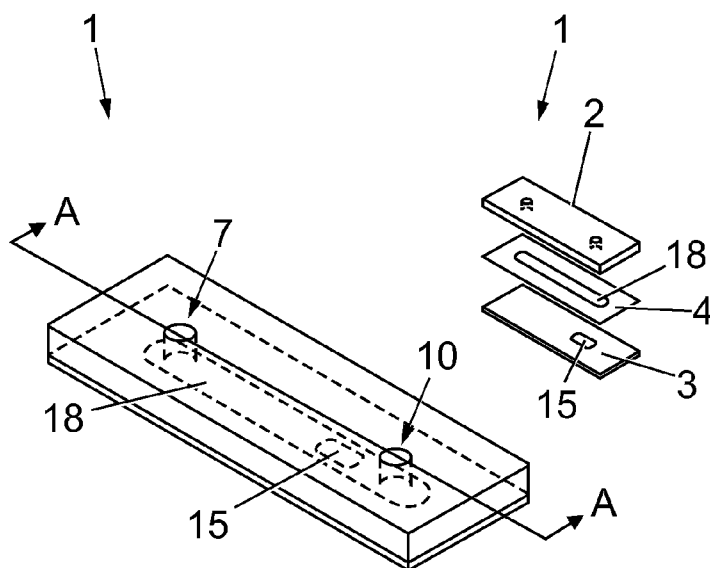


Fig. 1

(57) Abstract: An object/test material interaction microfluidic device comprising a sample inlet adapted to receive a fluid sample comprising a plurality of objects, an outlet adapted to output the fluid sample from the device, at least one internal surface defining a flow cavity within the device, wherein the flow cavity extends between and is connected to the sample inlet and the outlet for flow of the fluid sample through the flow cavity, the flow cavity comprises a test area to which at least one test material is attached and which is situated in the flow cavity for flow of the fluid sample over the test area, and the flow cavity has an aspect ratio which, when the flow cavity is substantially filled by the fluid sample, provides a substantially constant shear force between the test area and the fluid sample flowing over the test area. The invention further comprises a system incorporating the device, methods of use of the device and system, and methods of analysing interactions.



MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR),
OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML,
MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

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PCT/EP2009/051346

A. CLASSIFICATION OF SUBJECT MATTER

INV. G06T7/20 B01L3/00 G01N33/49

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06T B01L G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC, COMPENDEX, BIOSIS, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2006/134800 A1 (MALMQVIST MAGNUS [SE] ET AL) 22 June 2006 (2006-06-22)	1-7, 9-14
Y	paragraphs [0010], [0052], [0061], [0063], [0067], [0074], [0085]; figures 2A-B, 5A-B, 10	2, 6, 8, 12, 15, 16
Y	DE 10 2005 003961 A1 (BOEHRINGER INGELHEIM MICROPART [DE]) 10 August 2006 (2006-08-10)	2
A	paragraphs [0005], [0020], [0024], [0030], [0040], [0047], [0056], [0066]; figures 1, 2	1, 3-16
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☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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- *G* document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Eckert, Lars

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2009/051346

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 201 304 A (MICROPARTS GMBH [DE] BOEHRINGER INGELHEIM MICROPART [DE]) 2 May 2002 (2002-05-02)	2
A	paragraphs [0001], [0007], [0015], [0018], [0022], [0025], [0027], [0037], [0062]; figures 1,6	1,3-16
Y	WO 2006/119806 A (AGILENT TECHNOLOGIES INC [US]; WITT KLAUS [DE]; VAN DE GOOR TOM [US]) 16 November 2006 (2006-11-16)	6,12
A	abstract; figures 1A-B,2-7	1-5,7-16
Y	US 2005/106066 A1 (SALTSMAN PATRICK [US] ET AL SALTSMAN PATRICK [US] ET AL) 19 May 2005 (2005-05-19)	15
A	paragraphs [0003], [0007], [0012], [0013], [0069], [0070]; figure 6B	1-14,16
Y	WO 2007/089777 A (UNIV CHICAGO [US]; ISMAGILOV RUSTEM F [US]; KASTRUP CHRISTIAN J [US];) 9 August 2007 (2007-08-09)	8,16
A	paragraphs [0005] - [0021], [0151] - [0154]; figure 12	1-7,9-15
A	US 2006/127275 A1 (HOLL MARK R [US] ET AL) 15 June 2006 (2006-06-15)	1-16
	abstract	
A	WO 2007/024701 A (UNIV CALIFORNIA [US]; LEE LUKE P [US]; DI CARLO DINO [US]; NEVILL JOSH) 1 March 2007 (2007-03-01)	1-16
	paragraphs [0004] - [0007], [0028] - [0030]; figures 4A-C,7	
X	US 6 473 698 B1 (ALBERT THOMAS A [US] ET AL) 29 October 2002 (2002-10-29)	17-19, 21-25
	abstract column 1, lines 14-61 column 3, lines 12-16 column 9, line 36 - column 10, line 46	
X	FOSTER J ET AL: "An angle independent pattern recognition algorithm for ultrasound image blood flow estimation" SYSTEM THEORY, 1990., TWENTY-SECOND SOUTHEASTERN SYMPOSIUM ON COOKEVILLE, TN, USA 11-13 MARCH 1990, LOS ALAMITOS, CA, USA, IEEE COMPUT. SOC, US, 11 March 1990 (1990-03-11), pages 2-6, XP010018861 ISBN: 978-0-8186-2038-6 abstract sections "Introduction", "Algorithm Description"	17,23, 25,26
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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2009/051346

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	J. C. KENT, W.-C. CHOI, Y. G. GUEZENNEC: "Dynamic photogrammetry utilizing high-speed digital imaging" PROCEEDINGS OF THE 22ND INTERNATIONAL CONGRESS ON HIGH-SPEED PHOTOGRAPHY AND PHOTONICS, SPIE, [Online] vol. 2869, 1997, pages 794-797, XP002546544 USA Retrieved from the Internet: URL: http://spiedl.aip.org/getpdf/servlet/GetPDFServlet?filetype=pdf&id=PSISDG00286900001000794000001&idtype=cvips&prog=normal > [retrieved on 2009-09-03] abstract -----	17,28

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2009/051346

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search reportcovers only those claims for which fees were paid, specifically claims Nos.:
1-28
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-16

Microfluidic device suitable for detection of an analyte and corresponding method.

2. claims: 17-28

A method for determining a trajectory of an object in a flowing fluid sample.

3. claims: 29-31

A method for determining interactions of an object in a flowing fluid sample.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2009/051346

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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