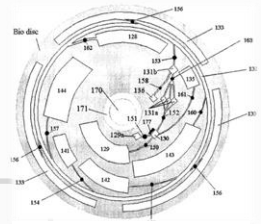
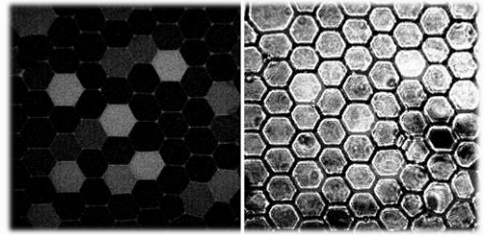
Microfluidic Technologies for Diagnostic Applications

Patent Landscape Analysis

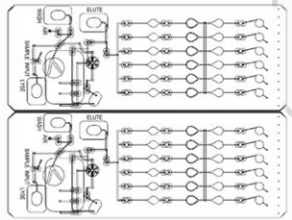
January 2017



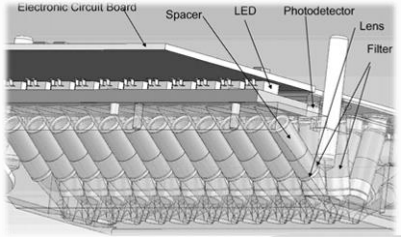
Samsung Electronics



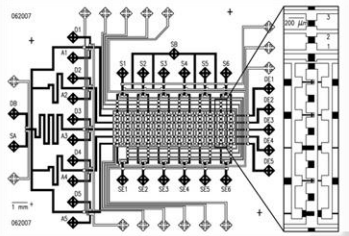
University of California



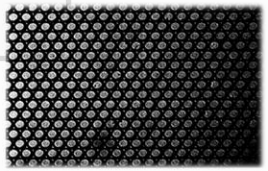
Micronics



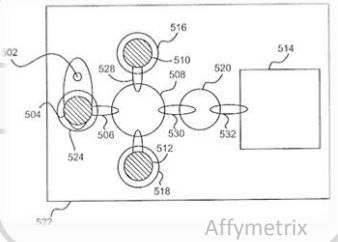
Handylab



Caltech



GPB Scientific



Affymetrix

REPORT SAMPLE

KnowMade
Patent & Technology Intelligence

TABLE OF CONTENTS

INTRODUCTION

Microfluidic Technologies for Diagnostic Applications

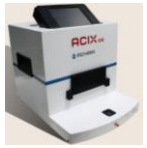
Microfluidic technologies are very suitable for diagnostic applications. By miniaturizing the diagnostic system, microfluidic technologies allow to reduce drastically the volume of sample needed to perform the diagnostic assay as well as the processing time. The development of microfluidic technologies also led to the development of easy-to-use point-of-care (POC) assay. Microfluidic-based diagnostics cover a wide range of pathologies, including genetic, infectious, oncology, blood coagulation, cardiac markers,… Microfluidic systems can be used at different levels of a disease : detection and characterization, disease evolution monitoring and treatment efficiency monitoring. Most microfluidic diagnostic systems are chips, but flow cells and paper-based systems also exists.

A recent report from Yole Développement estimates that the market for microfluidic chips and microfluidic-based tests for point-of-need (PoN) testing applications should increase from $6 billion in 2015 to 17.2 billion in 2021*. Many companies have developed and marketed microfluidic devices for diagnostic applications, including :

ABAXIS

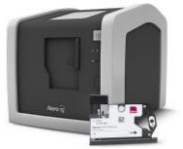
Piccolo Xpress
Chemistry analyzer and microfluidic discs (kidney, liver, metabolic diseases, lipids,…)

ACHIRA



Microfluidics cartridges and analyzer
hormones testing (fertility, pregnancy, thyroid)

Alere



Alere™ q
HIV-1/2 Detect PCR system

BD

FACSPresto
Measurement of CD4 T lymphocytes and total hemoglobin concentration in whole blood samples (AIDS applications).

BIOCARTIS

Idylla
Real-time PCR based molecular diagnostic system

Cepheid

GeneXpert® IV
On-demand molecular diagnostic system and Xpert cartridge

IDEX HEALTH & SCIENCE

Flow cells

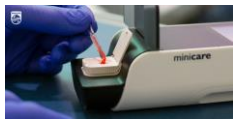
illumina

HiSeq system (HiSeq2500)
Ultra-high-throughput sequencing system

micronics

PanNAT® Molecular diagnostic system
Point of care infectious disease diagnosis based on single and/or multiplexed nucleic acid amplification assay.

PHILIPS



Minicare I-20
Near-patient diagnosis device based on Philips' Magnotech biosensor technology (immunoassay). It measures the level of Troponin-1, a cardiac marker (heart attack).

Roche

cobas Liat system
Real-time PCR system for diagnosis for Influenza A/B and Strep A (developed with the technology of Iquum, acquired in 2014).

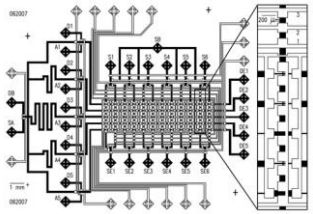
Source : Yole Développement, Point-of-Need Testing: Application of Microfluidic Technologies 2016 report (September 2016) (link)

INTRODUCTION

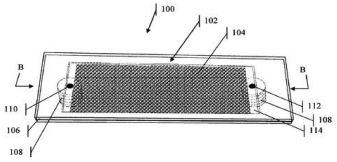
Scope of the Report

- This report provides a detailed picture of the patent landscape for **microfluidic technologies for diagnostic applications.**
- This report covers **patents published worldwide up to October 2016**.
- We have selected and analyzed more than **1,150 patent families** relevant to the scope of this report.

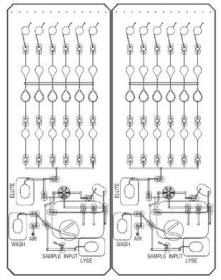
Included in the report



US2010267162

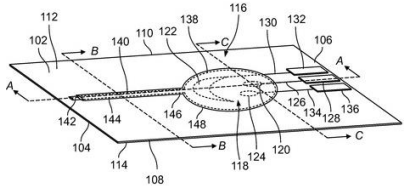


US2014017776

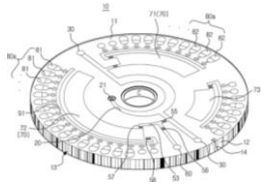


US2015152481

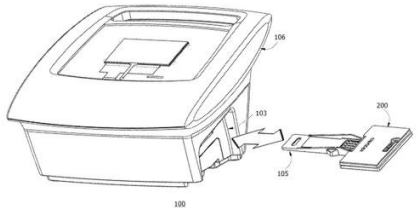
Microfluidic-based diagnostic systems and methods : microchips, cartridges, discs, flow cells, paper-based microfluidic systems…



US2016116427

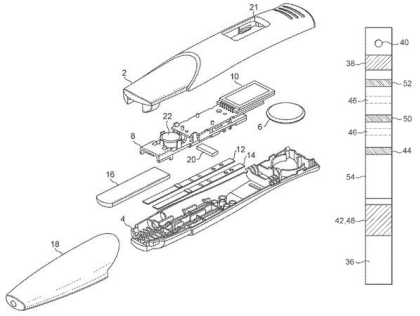


KR20110009022



WO2014100725

Not included in the report



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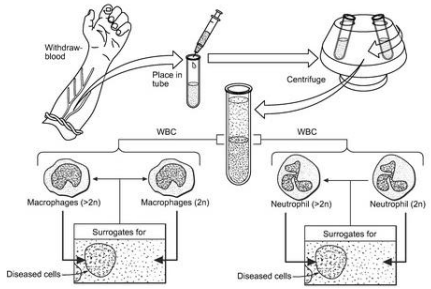
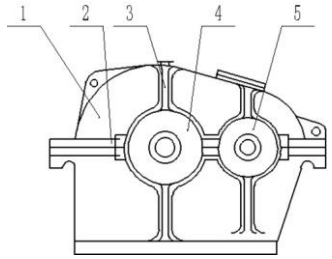
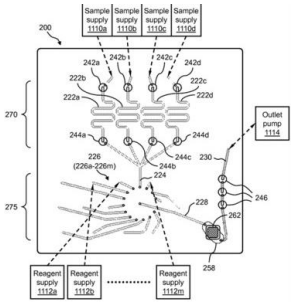


US2016160283

Diagnostic systems that do not involve microfluidics : test strips, large volume,…



CN204788465



WO2015138648

Microfluidic systems that are not intended for biomedical or diagnostic applications

METHODOLOGY

Patent Search, Patent Selection, Patent Analysis (1/2)

- The data were extracted from the **FamPat worldwide database** (Questel-ORBIT) which provides 90+ million patent documents from 90+ offices.

- The search for patents was performed in **October 2016**, hence patents published after this date will not be available in this report.

- The patents were grouped by **patent family**. A patent family is a set of patents filed in multiple countries to protect a single invention by a common inventor(s). A first application is made in one country – the priority country – and is then extended to other countries.

- The **selection of the patents** has been done both **automatically** and **manually** (all details in next slides).

Number of selected patent families for microfluidic technologies for diagnostic applications :

1,154 over a number of returned results > 2,000

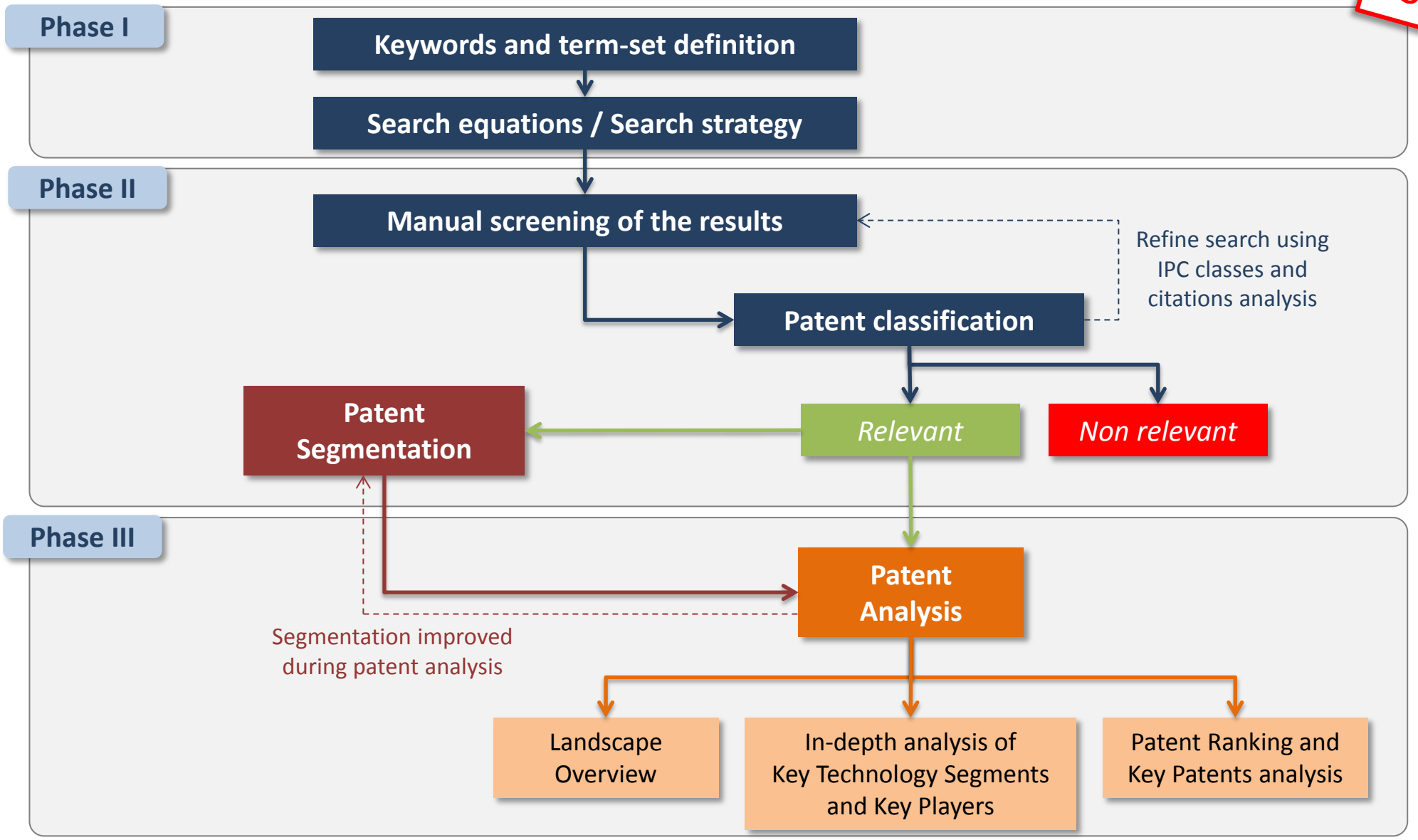
- The statistical analysis was performed with **Orbit IP Business Intelligence web based patent analysis software from Questel**.

- The patents were **manually categorized in technical segments** using keyword analysis of patent title, abstract and claims, in conjunction with expert review of the subject-matter of inventions (all details in next slides).

- For legal status of European (EP) and PCT (WO) patent applications, EPO Register Plus has been used. For legal status of US patents, USPTO PAIR has been used. For legal status of other patents, information have been gotten from their respective national registers.

METHODOLOGY

Patent Search, Patent Selection, Patent Analysis (2/2)



METHODOLOGY

Search Strategy

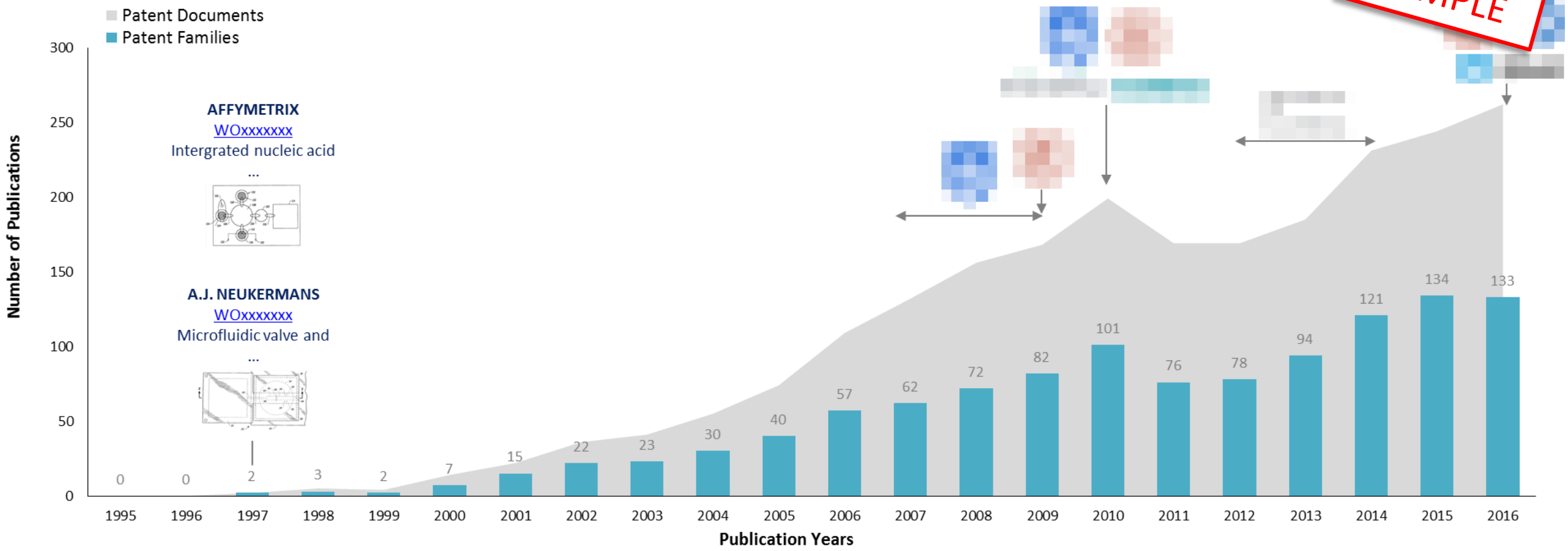
	Step	Search Equation	Results
Patent Related to microfluidic technologies for diagnostic applications	**Step 1**	((+DIAGNOS+ OR XXXX_XX_XXXX)/BI/CLMS/OBJ OR (A61B-XXX+ OR A61B-XXX+)/IC) AND (MICRO_FLUID+ OR XXXX_XXXX+ OR MICRO_XXXXXXX+ OR XXXX_XXXXXXX+ OR XXX_XX_XXXX? OR XXX_XX_X_XXXX OR XXXX_XXXX_XXXXXXX_XXXXX?)/BI/CLMS/OBJ	>2,000
Citing and Cited Patents	**Step 2**	CITING AND CITED PATENTS OF SELECTED PATENTS FROM STEP 1	>18,500
Manual Selection	**Step 3**	**SELECTED PATENT FAMILIES**	**1,154**

- + Truncation replacing any number of characters
- ? Truncation replacing zero or one character
- # Truncation replacing one character
- _ Truncation for word that may have a space (ex: semiconductor, semi conductor)
- OR Finds references containing at least one of the words
- AND Finds references containing all words
- S Finds references containing the terms in the same sentence
- nD Finds references containing adjacent terms, regardless of the order, and may be separated by a maximum of n words

- ( ) Parentheses are necessary to combine different operators
- /TI/OTI Search in Title
- /BI Search in Title and Abstract
- /CLMS Search in Claims
- /OBJ Search in the object of the invention
- /PA.FLD Search in Patent Assignees
- /IC Search in International Patent Classification (IPC)

OVERVIEW

Time Evolution of Patent Publications



Note: The patent search was done in October 2016, the data corresponding to the year 2016 are not complete here.

Microfluidics emerged in the 1980s for various applications. However, patents dedicated to microfluidics claiming diagnostic applications were firstly published in the late 1990s. In particular, a patent of **Affymetrix**, published in 1997, is related to a microfluidic system for nucleic acid based diagnostic applications (WOxxxxxxx). From the late 1990s, the number of new patent publications increase regularly until 2010. Main patent applicants in the late 2000s involve **APPLICANT XXX**, **APPLICANT XXX**, **APPLICANT XXX** and **APPLICANT XXX**. After a slight decrease, the number of publications increase again in 2013, but it seems to increase more slowly in the last 2 years. To this date, over 1,150 patent families have been published related to microfluidic technologies for diagnostic applications. It represents over 4,500 patents. In 2016, main applicants are **APPLICANT XXX**, **APPLICANT XXX** and **APPLICANT XXX**.

OVERVIEW

Time Evolution by Country of Filing

FILING COUNTRY	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AUSTRALIA			1	2	2	3	15	9	10	12	14	6	11	5	7	2	3	9	11	13	18	8
CANADA				1	1	1	4	5	3	11	15	11	11	10	9	5	12	14	12	12	13	
CHINA							1	2	3	4	8	8	22	26	37	38	36	32	33	41	65	63
EUROPE				2		2	3	5	7	16	15	25	36	52	26	46	35	34	27	35	35	47
GERMANY						1		1	6	3	5	13	4	5	4	15	9			5	3	2
INDIA												2	10	9	7	13	4	7	9	8	6	12
JAPAN					1	2	1	1	7	9	10	8	19	35	29	27	12	20	27	23	24	29
KOREA							1	1	1	4	3	8	10	13	9	6	13	16	15	17	15	9
USA				1	2	5	6	22	16	24	34	38	44	59	59	87	88	74	80	94	91	110
WO (PCT)			2	3	2	5	13	14	14	14	29	39	47	53	46	50	33	50	55	65	67	77

0-9 patent families | 20-29 patent families | 40-49 patent families

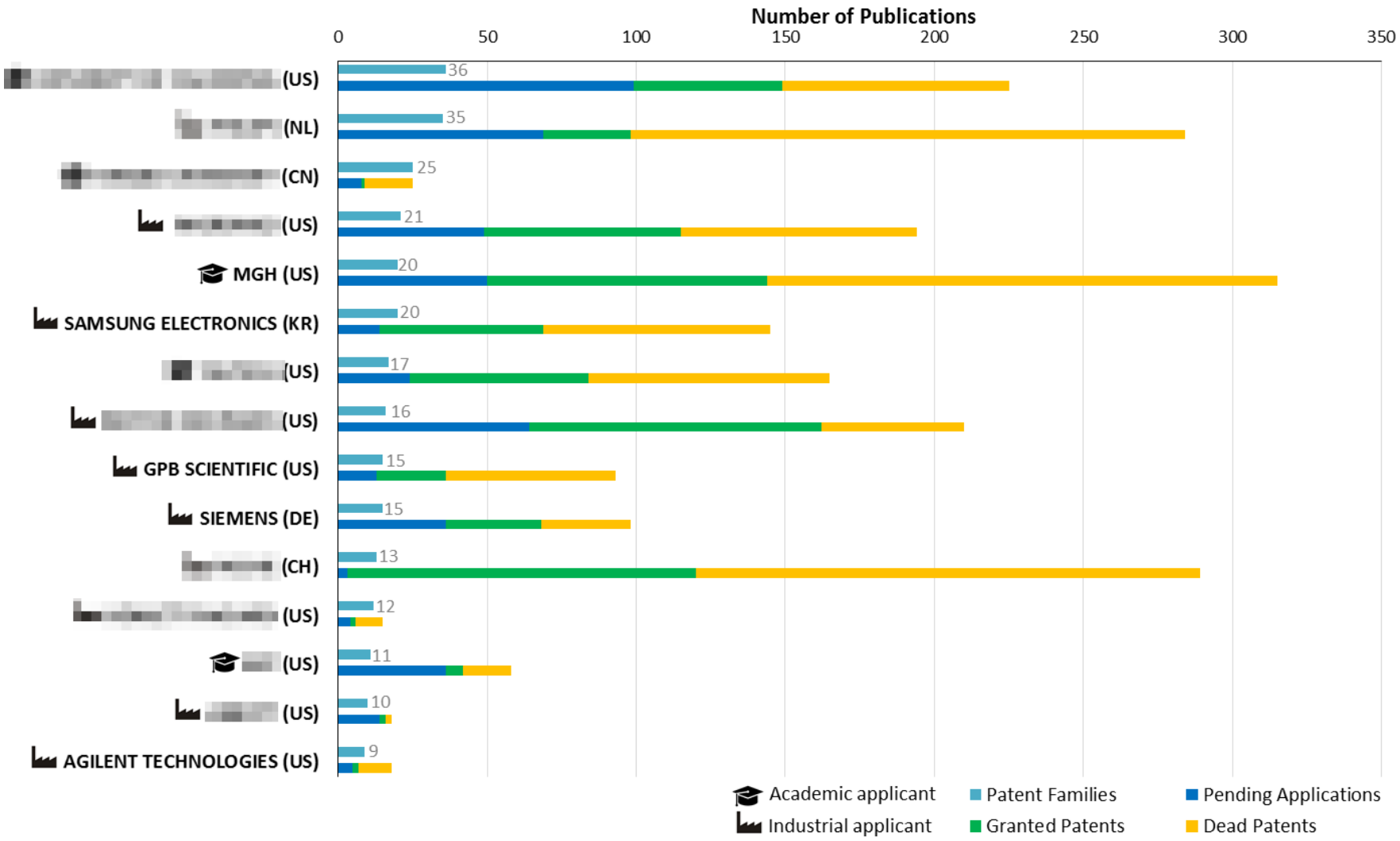
10-19 patent families | 30-39 patent families | ≥ 50 patent families

Note: International (WO) and European (EP) applications may hide other countries that are not yet published.

Patenting activity related to microfluidic technologies for diagnostic applications started in the USA in the late 1990s, it has been increasing ever since. In 2016, publications in the domain represent over 100 patents. In Europe, the patenting activity started at the same period as in the USA, however, it is still low. The peak observed in 2008 in Europe is correlated with a high number of applications from **APPLICANT XXX** and **APPLICANT XXX**. The IP activity in China was at the same level as in Europe during the late 2000s/early 2010s. However, the publication of Chinese applications is greatly increasing since 2014. The IP activity in China in the domain of microfluidic technologies for diagnostic applications involves in particular numerous Chinese applicants.

OVERVIEW

Ranking of Main Patent Applicants



The domain of microfluidic techno… diagnostic applications represents over 1,150 patent families. The Top-15 of the main assignees owns almost 25% of the whole patent families. The portfolios of the main patent assignees include less than 40 families. Therefore the IP landscape of microfluidic technologies for diagnostic applications involves numerous assignees with small portfolios.

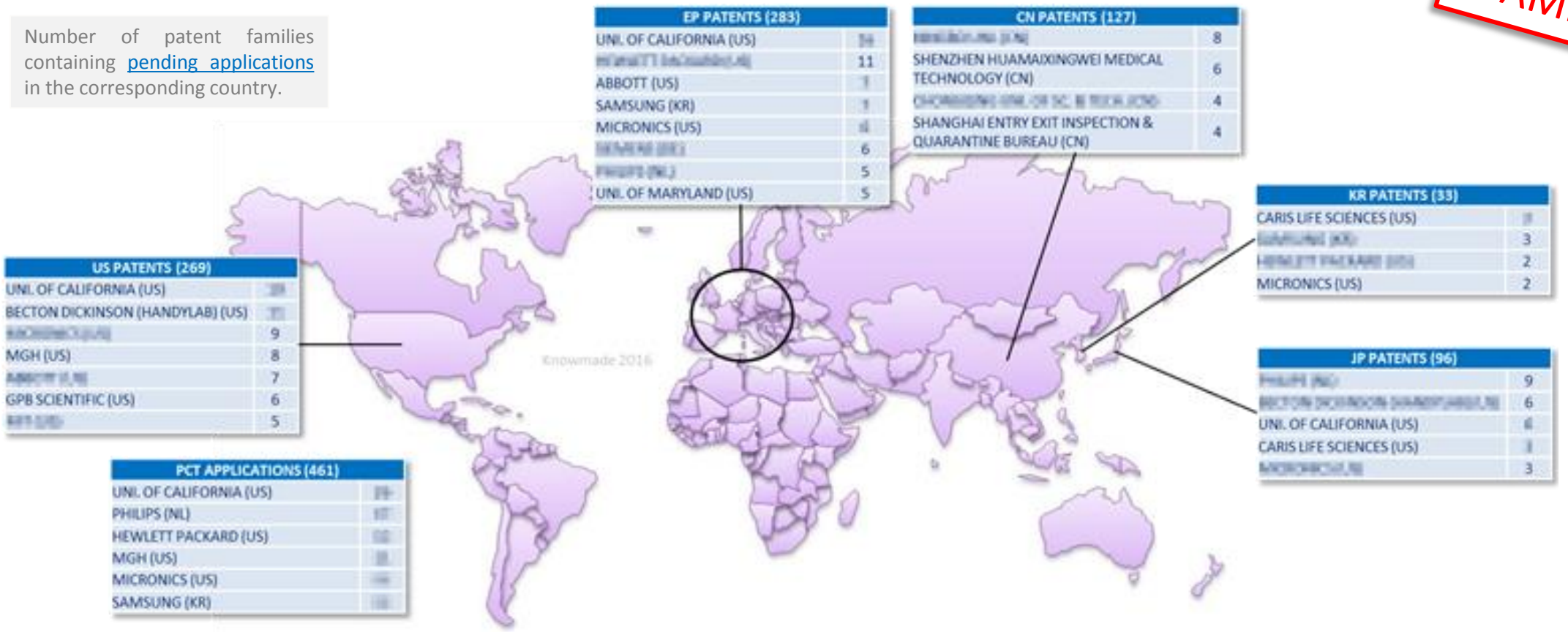
Currently, main IP applicants are US players, both industrial and academic : 10 US assignees appear in the Top-15 ranking of main applicants. **APPLICANT XXX** owns the largest portfolio, with 36 patent families. Moreover, the portfolio of **APPLICANT XXX** includes a high number of patents and over half of them are granted or pending. Three European companies are also well ranked, in particular **APPLICANT XXX** who holds the 2nd largest portfolio. The Dutch company has also well developed its portfolio by filing many patents. **APPLICANT XXX** shows the same profile with 13 patent families including over 280 patents. Two Asian assignees appear among the 15 main patent applicants : **APPLICANT XXX** (3rd largest portfolio) and **APPLICANT XXX** (6th). However, **APPLICANT XXX** only owns 1 patent per family, and these patents are exclusively published in China.

Note: the number of patents assigned to a company doesn't necessarily reflect the strength of its portfolio or its market dominance.

OVERVIEW

Mapping of Main Current IP Applicants

Number of patent families containing pending applications in the corresponding country.



Already having a significant granted portfolio in the USA, **APPLICANT XXX** keeps reinforcing its presence in the country by filing new applications, while showing a strong interest in Europe as well as Japan. **COMPANY XXX**, who acquired **APPLICANT XXX** in 2009, is also showing a strong IP activity in the USA and Japan recently. As expected, **APPLICANT XXX** is the main current patent applicant in China. In this country, the IP activity of national applicants seems to increase. With **APPLICANT XXX**, the American companies **APPLICANT XXX** and **APPLICANT XXX** have been the most active applicants in 2016. **APPLICANT XXX** is well ranked among the main applicant in Europe and the USA and **APPLICANT XXX** filed over 10 PCT applications recently. Thus, the importance of both companies in the IP landscape of microfluidic technologies for diagnostic applications should increase in the near future.

OVERVIEW

Summary of Applicant's Patent Portfolio (1/2)

ASSIGNEE	No. of patent families	Oldest priority date of the portfolio	No. of families filed / yr (average)	No. of patent documents	No. of patents / Family (average)	Patent average age (yr)	% granted	% pending	% dead (revoked lapsed expired)	No. of alive patents / Family (granted, pending)	No. of granted patent families by country				
											US	EP	JP	CN	KR
APPLICANT XXX	xx	20xx	2.3	225	xx	xx	22%	xx%	xx%	4.1	17	1	3	5	-
APPLICANT XXX	xx	2003	2.7	xx	8.1	7	xx%	xx%	65%	xx	5	1	2	4	-
APPLICANT XXX	25	2008	xx	25	1	xx	4%	xx%	xx%	0.4	-	-	-	1	-
APPLICANT XXX	21	20xx	1.3	194	9.2	xx	xx%	25%	xx%	xx	11	4	6	3	-
APPLICANT XXX	xx	20xx	1.4	xx	15.8	5	xx%	xx%	54%	7.2	5	3	-	2	-
APPLICANT XXX	xx	2001	xx	145	xx	xx	38%	xx%	xx%	xx	13	4	7	8	12
APPLICANT XXX	17	20xx	1.1	xx	xx	xx	36%	xx%	xx%	xx	10	1	1	1	-
APPLICANT XXX	16	2003	xx	xx	13.1	5	47%	xx%	xx%	10.1	5	3	3	2	-
APPLICANT XXX	xx	2002	1.1	xx	6.2	5	xx%	14%	xx%	2.4	4	1	-	1	-
APPLICANT XXX	xx	20xx	1	98	xx	xx	33%	xx%	31%	xx	4	-	1	2	-
APPLICANT XXX	xx	2001	0.9	289	xx	7	xx%	1%	xx%	9.2	9	7	5	4	-
APPLICANT XXX	12	2005	xx	xx	xx	xx	4%	80%	xx%	xx	-	-	-	-	-
APPLICANT XXX	xx	20xx	0.8	58	xx	4	xx%	x%	28%	xx	2	-	-	-	-
APPLICANT XXX	xx	2010	xx	18	xx	0	11%	xx%	11%	1.6	2	-	-	-	-
APPLICANT XXX	xx	19xx	0.5	18	xx	xx	xx%	28%	61%	xx	2	-	-	-	-

highest value in column lowest value in column

OVERVIEW

Summary of Applicant's Patent Portfolio (2/2)

Most of the main assignees in the domain of microfluidics for diagnostic applications started their IP activity in the domain in the early 2000s. **APPLIC** shows a very important IP activity. Holding the 1st largest portfolio (36 families), **APPLICANT XXX** also extends significantly each of its families (6.3 patents/family in average). Moreover, many of those patents are alive : 22% of granted patents (50 patents) and 44% of pending applications (99 applications). Thus, **APPLICANT XXX** seems to have invested in the R&D of microfluidic technologies for diagnostic applications and is also developing its IP outside of the USA as well, mainly in Europe, Japan and China. In particular, **APPLICANT XXX** is developing cell-based assay technologies (see TECHNICAL ISSUES chapter).

APPLICANT XXX, 2nd largest portfolio, also shows a high level of dead patents in its portfolio (65%). **APPLICANT XXX** also holds 24% of pending applications, among which, many PCTs. However, it should be noted that **APPLICANT XXX** patents are often abandoned during the examination procedure.

APPLICANT XXX is showing the highest level of granted patents and the highest number of granted patents per family. The IP activity of **APPLICANT XXX** in the domain of microfluidic technologies for diagnostic applications is related to the acquisition of the portfolio of **APPLICANT XXX** in 2009. The technologies developed by **APPLICANT XXX** focus on nucleic acid analysis (see TECHNICAL ISSUES chapter).

The portfolio of **APPLICANT XXX** is composed of 13 patent families and includes 289 patents. This gives **APPLICANT XXX** the highest ratio of patents per family (22.2). If the company has only a few pending applications, **APPLICANT XXX** is holding many granted patents worldwide (40% of its portfolio). Thus **APPLICANT XXX** is an important player in the IP landscape of microfluidic technologies for diagnostic applications.

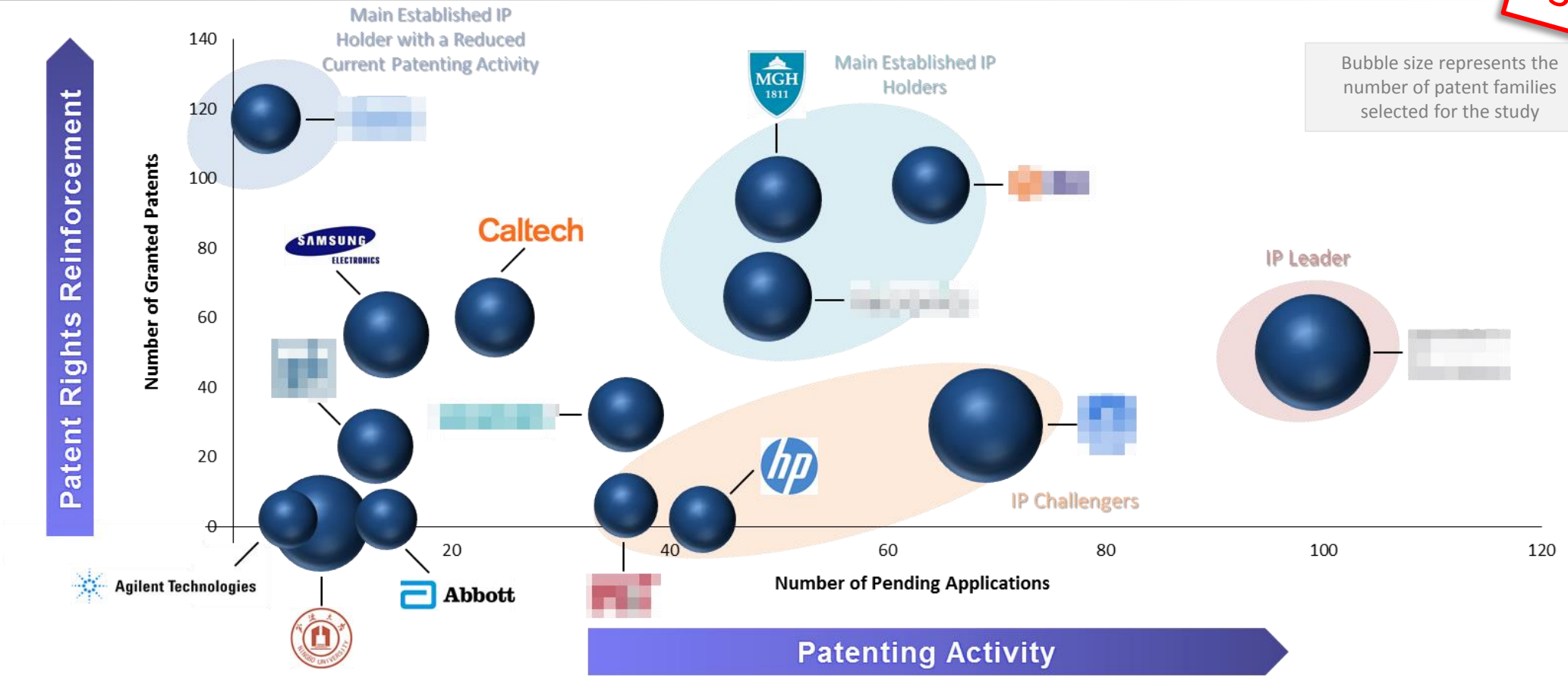
APPLICANT XXX shows an IP profile similar to **APPLICANT XXX**. **APPLICANT XXX** has 20 patent families which include 315 patents (ratio of 15.8 patents per family). Almost half of **APPLICANT XXX** portfolio is alive, it represents 7.2 patents alive per family.

APPLICANT XXX shows a steady IP activity in the domain of microfluidic technologies for diagnostic applications since the mid-2000s. The company is the only main IP applicant with granted patents in Korea.

The last main assignees to enter the IP landscape are **APPLICANT XXX** (2005), **APPLICANT XXX** (2008) and **APPLICANT XXX** (2010). **APPLICANT XXX** shows the highest rate of patent filing per year (3.1), but filed only 1 patent per family. Moreover, 64% of its portfolio is already dead. Thus, **APPLICANT XXX** is not currently an IP leader in the domain of microfluidic technologies for diagnostic applications. **APPLICANT XXX** holds a medium portfolio (12 families) and it includes a very high percentage of pending applications (80%). In particular, **APPLICANT XXX** filed 7 PCTs in 2015, thus its portfolio could potentially grow in the near future with new publications in several countries.

OVERVIEW

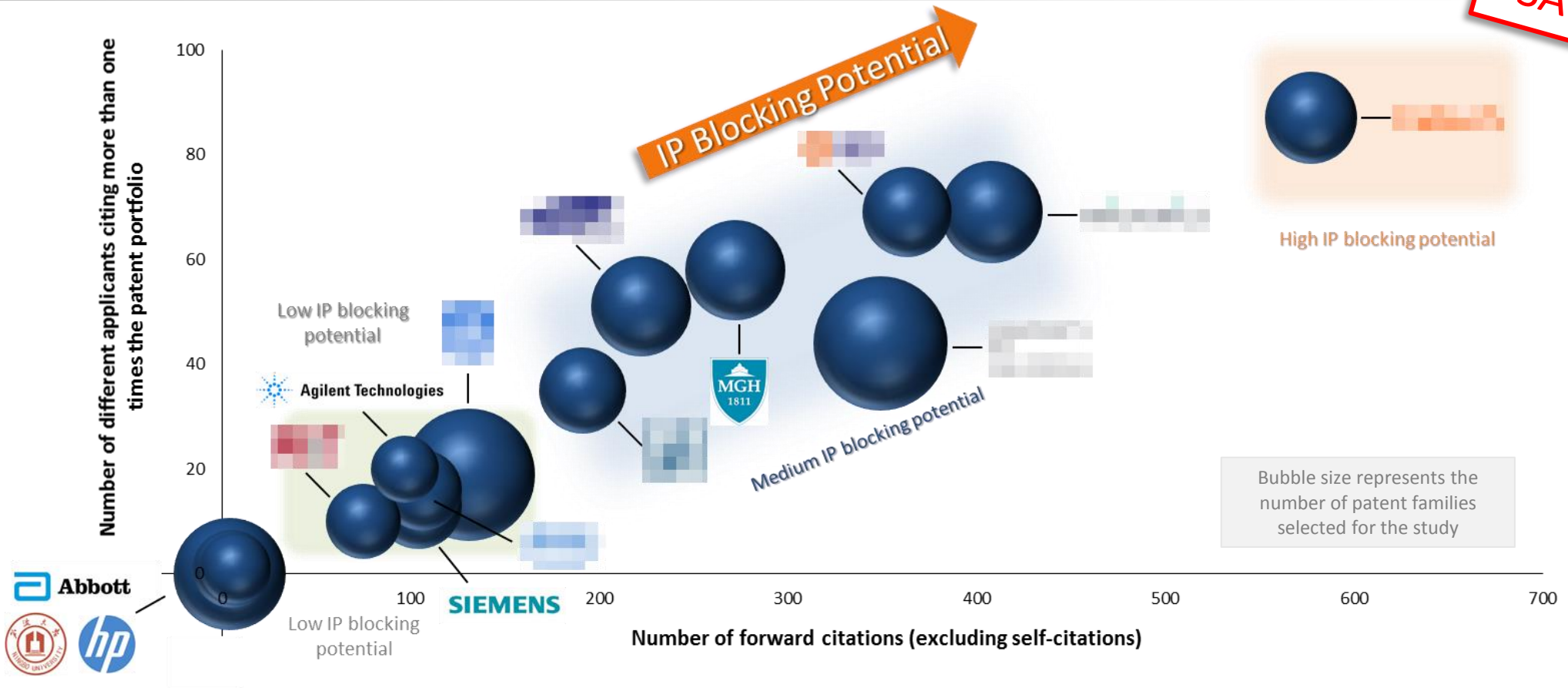
IP Leadership of Patent Applicants



APPLICANT XXX shows a very strong leadership, with a high number a granted patents and a very important current patenting activity (99 pending applications). This IP activity is associated with a worldwide strategy. **APPLICANT XXX** also holds a high number of pending applications, but as previously noted the applications of the company are often abandoned during the examination procedure. Thus, the importance of its IP leadership should be taken carefully. **APPLICANT XXX**, **APPLICANT XXX** and **APPLICANT XXX** have a significant leadership : they hold an important number of granted patents as well as pending applications. The leadership of **APPLICANT XXX** is linked to the acquisition of the **APPLICANT XXX** and its IP portfolio in 2009. **APPLICANT XXX** and **APPLICANT XXX** hold smaller portfolios and a few granted patents. However, both show currently an important patenting activity. Pending applications represent 80% of **APPLICANT XXX** portfolio. **APPLICANT XXX** has drastically reduced its patenting activity currently, but the company holds a very large granted portfolio, which is evidence of an important investment from the company in microfluidic technologies for diagnostic applications. Globally, apart from **APPLICANT XXX**, the IP leadership in microfluidic technologies for diagnostic applications is overtaken by US assignees.

OVERVIEW

IP Blocking Potential of Patent Applicants



The more the number of forward citations from different patent applicants is high, the more the capacity to hamper the other firms' attempts to patent a related invention is important.
Note: This graph is at patent family level. The identification of a "blocking patent" requires an in-depth specific analysis of each patent documents composing the patent families.

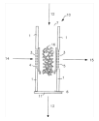
The IP blocking potential is an indicator of how an IP player and its patents are difficult to circumvent in a technology. The IP blocking potential is not necessarily linked to the size of the portfolio.

APPLICANT XXX holds the highest IP blocking potential related to microfluidic technologies for diagnostic applications. The patents of **APPLICANT XXX** (in particular USxxxxxxxxxx and USxxxxxxxxxx) receive a high number of forward citations from many different applicants, and in particular from **APPLICANT XXX**. Several assignees show a medium IP blocking potential: **APPLICANT XXX APPLICANT XXX**, **APPLICANT XXX**, **APPLICANT XXX, APPLICANT XXX** and **APPLICANT XXX**.

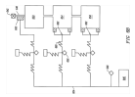
OVERVIEW

Key Patent Families

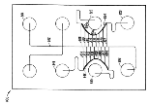
APPLICANT XXX
USxxxxxxx
Integrated microfluidic devices



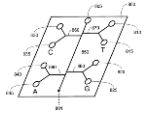
APPLICANT XXX
USxxxxxxx
Integrated nucleic acid diagnostic device



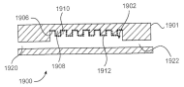
APPLICANT XXX
USxxxxxxxxx
Microfluidic sequencing...



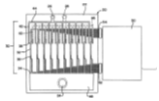
APPLICANT XXX
USxxxxxxx
Manipulation of microparticles...



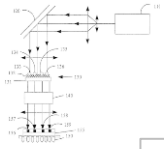
APPLICANT XXX
USxxxxxxxxxxx
Miniaturized genetic analysis ...



APPLICANT XXX
USxxxxxxx
Integrated active flux microfluidic ...

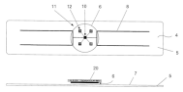


APPLICANT XXX
USxxxxxxx
Sers diagnostic platforms, methods and systems including ...

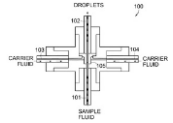


APPLICANT XXX
USxxxxxxx
Integrated biosensor and simulation system for ...

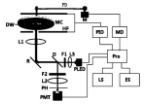
APPLICANT XXX
USxxxxxxx
Diagnostic radio frequency identification sensors ...



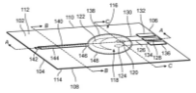
APPLICANT XXX
USxxxxxxx
Digital analyte analysis



APPLICANT XXX
APPLICANT XXX
CNxxxxxxxxx
Rapid parallel nucleic acid detection method ...



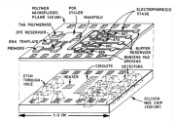
APPLICANT XXX
USxxxxxxxxxx
Paper substrate diagnostic apparatus and ...



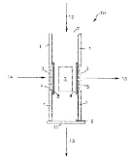
Earliest application year of the family

1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016

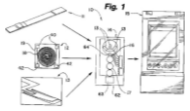
APPLICANT XXX
APPLICANT XXX
USxxxxxxx
Polymer-based micromachining...



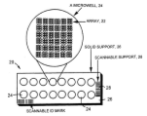
APPLICANT XXX
USxxxxxxx
Integrated microfluidic devices



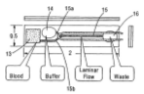
APPLICANT XXX
USxxxxxxx
Integrated microchip genetic ...



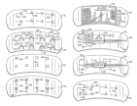
APPLICANT XXX
USxxxxxxx
Clinically intelligent diagnostic ...



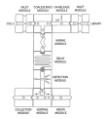
APPLICANT XXX
USxxxxxxx
Analyte monitoring and ...



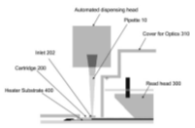
APPLICANT XXX
USxxxxxxx
Personal diagnostic devices and ...



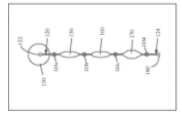
APPLICANT XXX
USxxxxxxxxxx
Microfluidic devices



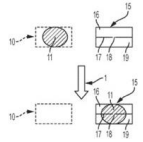
APPLICANT XXX
USxxxxxxx
Integrated system for processing microfluidic samples, ...



APPLICANT XXX
WOxxxxxxxxxx
Device for preparation and analysis of ...



APPLICANT XXX
WOxxxxxxxxxx
Devices and methods for sample analysis



The selection of key patent families is based on the family size, current legal status of patents, citations analysis and impact on the technological segment. See annexes for methodology for key patent identification. Patent numbers correspond to representative member of the families, assignee names take into account original applicants and reassignments.

TECHNICAL ISSUES

Search Equations

The patent families related to microfluidic technologies for diagnostic applications have been classified according to several technical segments (material, disease and diagnos… segments. Then, each technical segments has been analyzed.

			SEARCH EQUATION	SELECTED
MATERIAL	POLYMER		(POLYMER+ OR POLY_METHYL_METHACRYLATE OR PMMA OR POLY_DIMETHYLSILOXANE OR POLY_SILOXANE OR PDMS OR POLY_CARBONATE OR PC OR POLY_ETHYLENE_TEREPHTHALATE OR PETG OR CYCL+ OLEFIN CO_POLYMER OR COC OR POLYSTYRENE OR PS OR POLY_VINYL_CHLORIDE OR PVC OR POLY_TETRA_FLUORO_ETHYLENE OR TEFLON)/BI/CLMS/DESC	XXX
	GLASS		(GLASS+ OR SILICA+ OR SIO2 OR PYREX)/BI/CLMS/DESC	XXX
	SILICON		(SILICON OR SILICON_BAS+)/BI/CLMS/DESC	92
	PAPER		(PAPER OR PAPER_BASE+ OR CELLULOS+)/BI/CLMS/DESC	XXX
DISEASE	CANCERS		(CANCER? OR CARCINOMA? OR LEUKEMIA OR CTC? OR CIRCULATING TUMOR CELL? OR PROSTATE OR BREAST OR TUMOR+ OR TUMOUR+ OR LYMPHOMA OR PAPILLOMA OR SARCOMA)/BI/CLMS/DESC	XXX
	GENETIC DISORDERS		(GENETIC DISORDER? OR GENETIC ABNORMALIT+ OR GENETIC DISEASE? OR MUTATION?)/BI/CLMS/DESC	XXX
	INFECTIOUS DISEASES	ALL INFECTIOUS DISEASES	(INFECT+ OR VIRUS+ OR BACTERIA? OR PATHOGEN+)/BI/CLMS/DESC	XXX
		HIV	(HIV OR AIDS OR HUMAN IMMUNODEFICIENCY VIRUS OR ACQUIRED IMMUNODEFICIENCY)/BI/CLMS/DESC	112
		MALARIA	(MALARIA OR PLASMODIUM)/BI/CLMS/DESC	XXX
	NEURODEGENERATIVE DISORDERS		(NEURO_DEGENERA+ OR PARKINSON OR ALZHEIMER OR HUNTINGTON OR SCLEROSIS)/BI/CLMS/DESC	XXX
	DIABETES		(DIABETES OR GLUCOSE OR BLOOD SUGAR OR GLYC_MIA)/BI/CLMS/DESC	XXX
DIAGNOSTIC TECHNIQUE	NUCLEIC ACID AMPLIFICATION		(((NUCLEIC ACID? OR DNA OR RNA) S AMPLIF+) OR PCR OR POLYMERASE CHAIN REACTION OR LAMP OR LOOP MEDIATED ISOTHERMAL AMPLIFICATION)/BI/CLMS/DESC	XXX
	IMMUNOASSAYS		(IMMUNO_ASSAY+ OR IMMUNO_DETECT+)/BI/CLMS/DESC	115
	CELL-BASED ASSAYS		(PROLIFERATION OR MOTILITY OR (CELL+ S (SHAPE OR NUMBER OR COUNT+ OR MORPHO+ OR SIZE)))/BI/CLMS/DESC	XXX
	CHEMISTRY ASSAY		((+CHEMICAL OR +CHEMISTRY) S (ASSAY? OR ANALYS+ OR DETECT+)) OR (PH OR ELECTROLYTE? OR ENZYM+ OR COAGULAT+ OR CLOT+)/BI/CLMS/DESC	XXX

TECHNICAL ISSUES

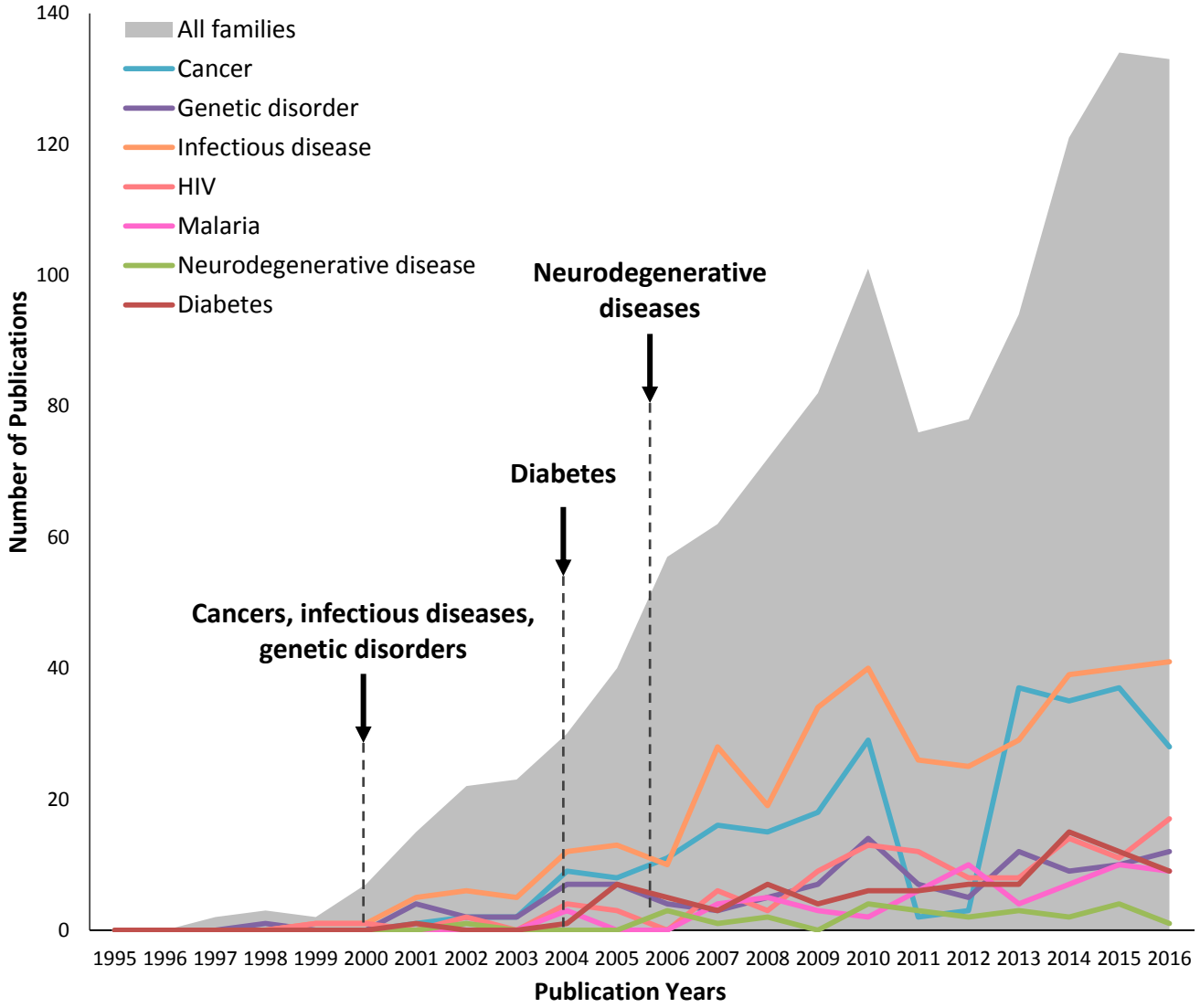
By Disease – Segmentation

ASSIGNEES	Number of Families	DISEASE (636 patent families selected)						
		CANCERS	GENETIC DISORDERS	INFECTIOUS DISEASES			NEURO-DEGENERATIVE	DIABETES
				ALL INFECTIOUS DISEASES	HIV	MALARIA		
TOTAL	1,154	XXX	XXX	XXX	112	XXX	XXX	XXX
MAIN ASSIGNEES IN THE SEGMENT		Applicant XXX (US), Applicant XXX (US), Applicant XXX (US), Applicant XXX (US), Applicant XXX (KR)	Applicant XXX (US), Applicant XXX (US)	Applicant XXX (CN), Applicant XXX (US), Applicant XXX (US), Applicant XXX(US)	Applicant XXX (US), Applicant XXX (CN)	Applicant XXX (US), Applicant XXX (US)	Applicant XXX (KR), Applicant XXX(US)	Applicant XXX (US), Applicant XXX (CH)
APPLICANT XXX	xx	17	3	13	8	3	1	1
APPLICANT XXX	xx	2	-	9	2	-	-	-
APPLICANT XXX	25	-	-	19	6	-	-	-
APPLICANT XXX	21	1	-	15	4	10	-	-
APPLICANT XXX	xx	13	5	13	5	2	1	2
APPLICANT XXX	xx	8		2	1	-	5	3
APPLICANT XXX	17	6	4	9	1	-	-	1
APPLICANT XXX	16	1	1	5	1	1	-	-
APPLICANT XXX	xx	12	9	7	3	-	-	1
APPLICANT XXX	xx	2	-	1	-	-	-	3
APPLICANT XXX	xx	-	-	-	-	-	-	4
APPLICANT XXX	12	2	1	4	2	1	-	-
APPLICANT XXX	xx	8	1	7	3	6	-	4
APPLICANT XXX	xx	3	-	3	3	-	-	-
APPLICANT XXX	xx	2	-	2	-	-	-	-

1-4 patent families | 5-9 patent families | 10-14 patent families | ≥ 15 patent families

TECHNICAL ISSUES

By Disease – Time Evolution of Patent Publications

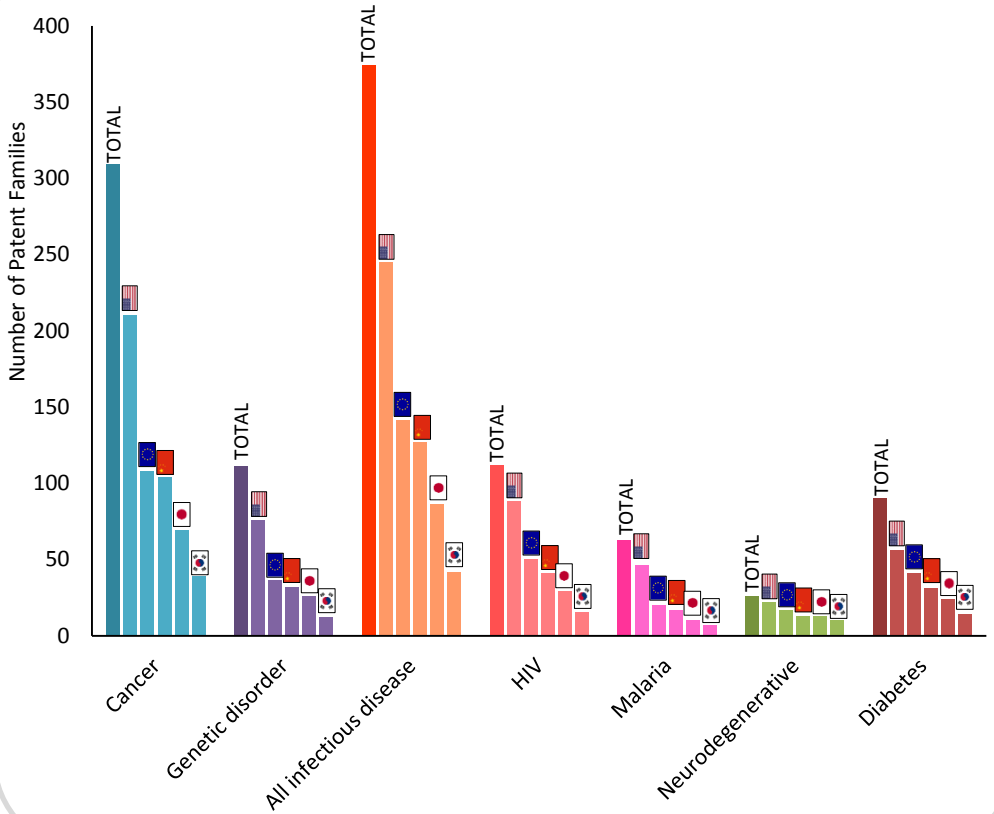


The diagnostic of cancers and infectious diseases using microfluidic systems are the most developed, they were also the 1st targets of the IP development (early 2000s). Both receive a significant focus from several main patent applicants in microfluidic technologies for diagnostic applications. American applicants **APPLICANT XXX**, **APPLICANT XXX** and **APPLICANT XXX** show an equal interest in both cancers and infectious disease diagnostics. **APPLICANT XXX** and **APPLICANT XXX** are focused on infectious disease diagnostics. Whereas **APPLICANT XXX** filed more patents related on cancers diagnostics and the company also shows a significant interest in the development of diagnostics for genetic disorders. It is also the case for **APPLICANT XXX**, **APPLICANT XXX** and **APPLICANT XXX**. The development of microfluidic diagnostic systems for diabetes appears in 2004, and the main applicants for this technology include **APPLICANT XXX** and **APPLICANT XXX**. Neurodegenerative disease diagnostics are the most recent medical applications (2006), and these applications are mainly developed by **APPLICANT XXX**.

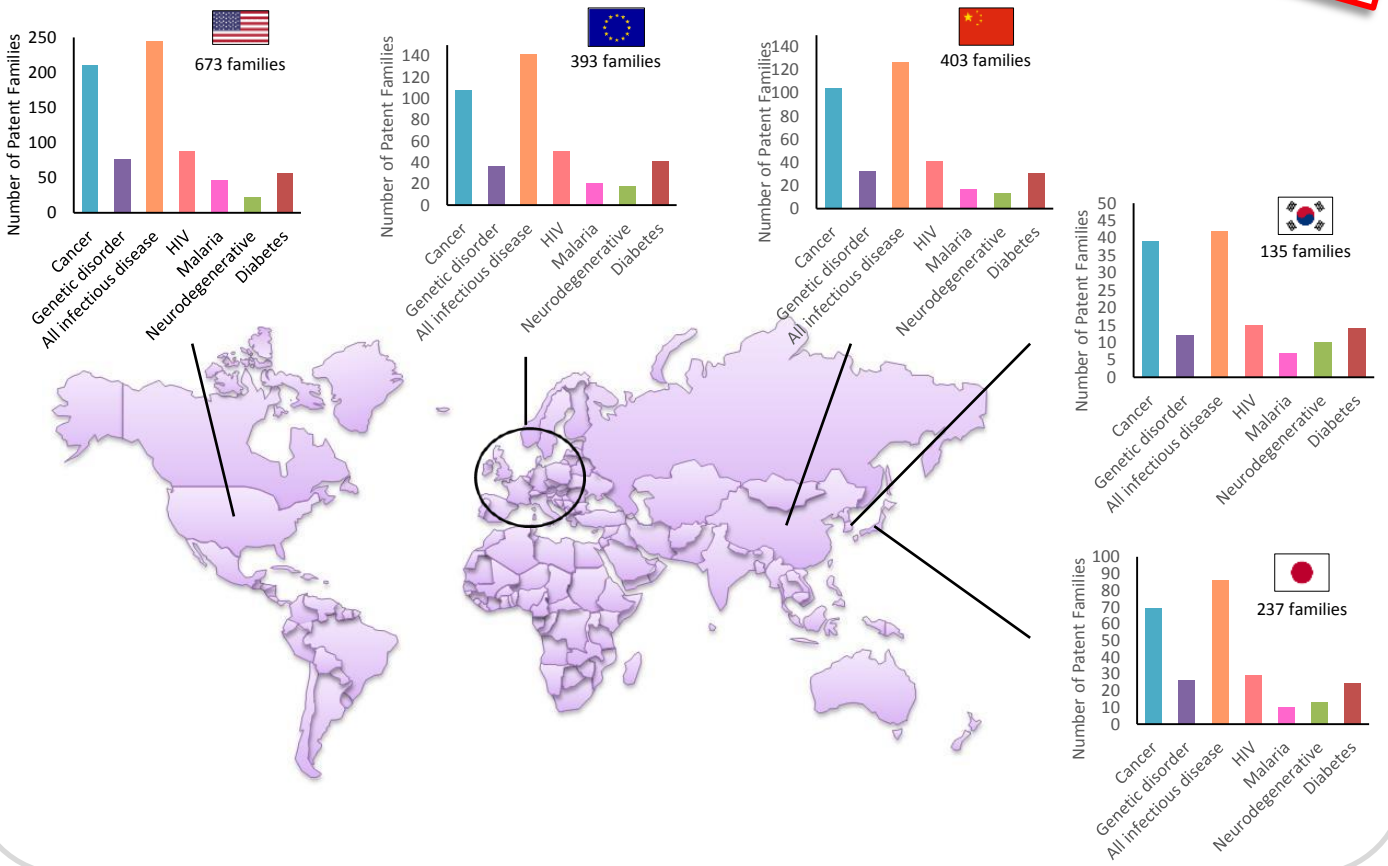
TECHNICAL ISSUES

By Disease – Countries of Patent Filings

Country by Disease targeted



Disease targeted by Country



The **USA** are the favorite country of filings for all diagnostic applications considered, followed by **Europe** and **China**, **Japan** and **Korea**. This probably reflects the high number of American players among the patent applicants. In all countries, **infectious diseases and cancers** are by far the most diagnostic applications claimed.

TECHNICAL ISSUES

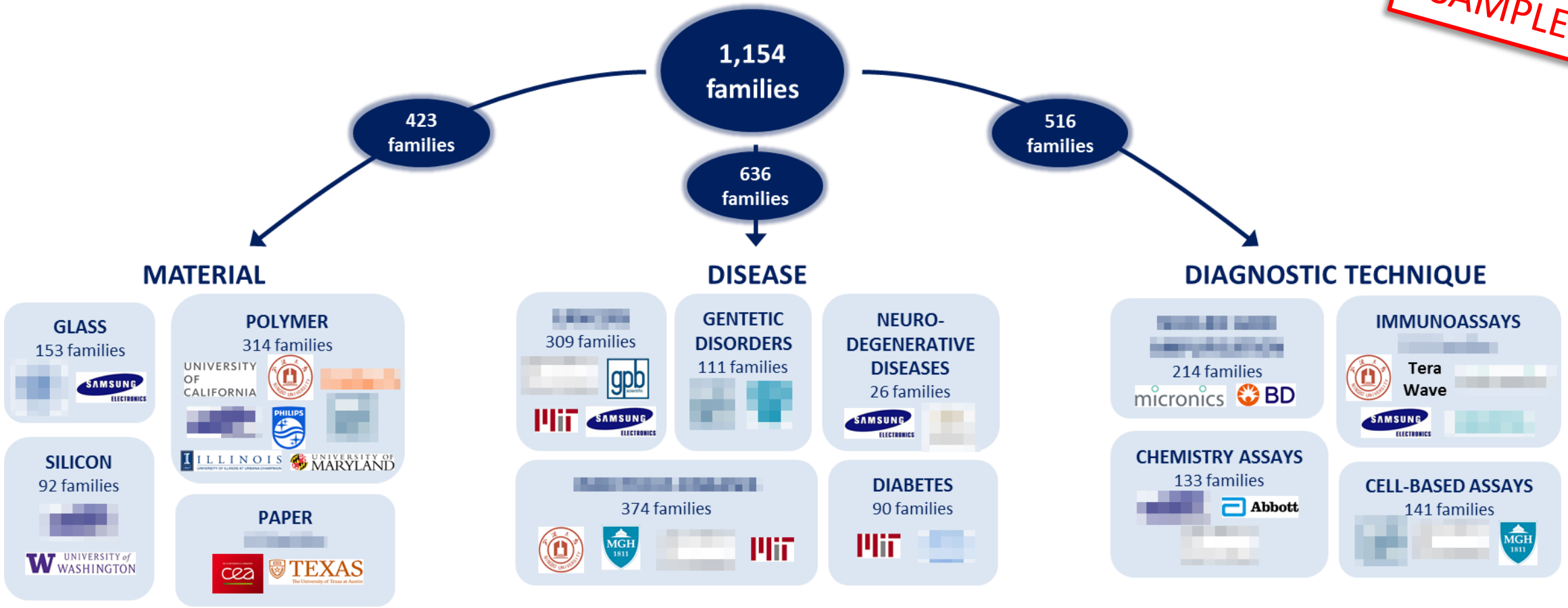
By Disease – Key Patents

PATENT NUMBER	ASSIGNEE	TITLE	PDF	CURRENT LEGAL STATUS	EXPIRATION DATE*	SEGMENT (disease)
USxxxxxxx	APPLICANT XXX	Clinically intelligent diagnostic device…	Open	Granted	2021-06-02	Cancer, genetic disorder, infectious disease (HIV)
USxxxxxxx	APPLICANT XXX	Manipulation of microparticle…	Open	Granted	2020-02-22	Infectious disease (HIV)
USxxxxxxxxxx	APPLICANT XXX	Integrated microfluidic assay…	Open	Lapsed	2014-12-31	Infectious disease (HIV, malaria)
USxxxxxxx	APPLICANT XXX	Personal diagnostic devices including…	Open	Granted	2024-09-02	Infectious disease (HIV), diabetes
USxxxxxxx	APPLICANT XXX	Medical device for analyte monitoring…	Open	Granted	2023-09-11	Cancer, infectious disease, diabetes
USxxxxxxx	APPLICANT XXX	Devices and methods for enrichment…	Open	Granted	2026-04-05	Cancer, genetic disorder, infectious disease
WOxxxxxxxxxx	APPLICANT XXX	Microfluidic system and method for analysis of gene…	Open	Lapsed	2009-08-02	Cancer
USxxxxxxx	APPLICANT XXX	Microfluidic nucleic acids…	Open	Granted	2023-10-02	Infectious disease
USxxxxxxx	APPLICANT XXX	Microfluidic device for cell separation…	Open	Granted	2026-01-24	Cancer, infectious disease

The selection of key patents is based on the family size, current legal status of patents, citations analysis and impact on the technological segment. See annexes for methodology for key patent identification.

TECHNICAL ISSUES

Conclusions



Among all the materials use for microfluidic system for diagnostic applications, **polymer materials represent a material of choice**. They can be used for any diagnostic technique and it is less expensive than other materials. **Glass** is suitable in particular for applications requiring high-precision and multiplexing. **The patenting of paper material is much more recent**. Paper-based systems are cheap and easy to use. However, cell-based assay can not be performed on this kind of systems.

Infectious diseases and cancers are the major diseases targeted by patent applicants in the domain of microfluidic technologies for diagnostic applications. Biomarkers, tumor cells, pathogens or viral particles are usually accessible in the circulating blood of the patient.

Nucleic acid amplification is the most widespread diagnostic technique in selected patents. It can be adapted to diagnose various kind of diseases by detecting a specific genetic fingerprint, usually present in the blood of the patient : tumor mutations of circulating tumor cells, detection of genetic disorders, DNA/RNA of viruses… It allows the analysis of thousands of nucleic acid biomarkers in one assay.

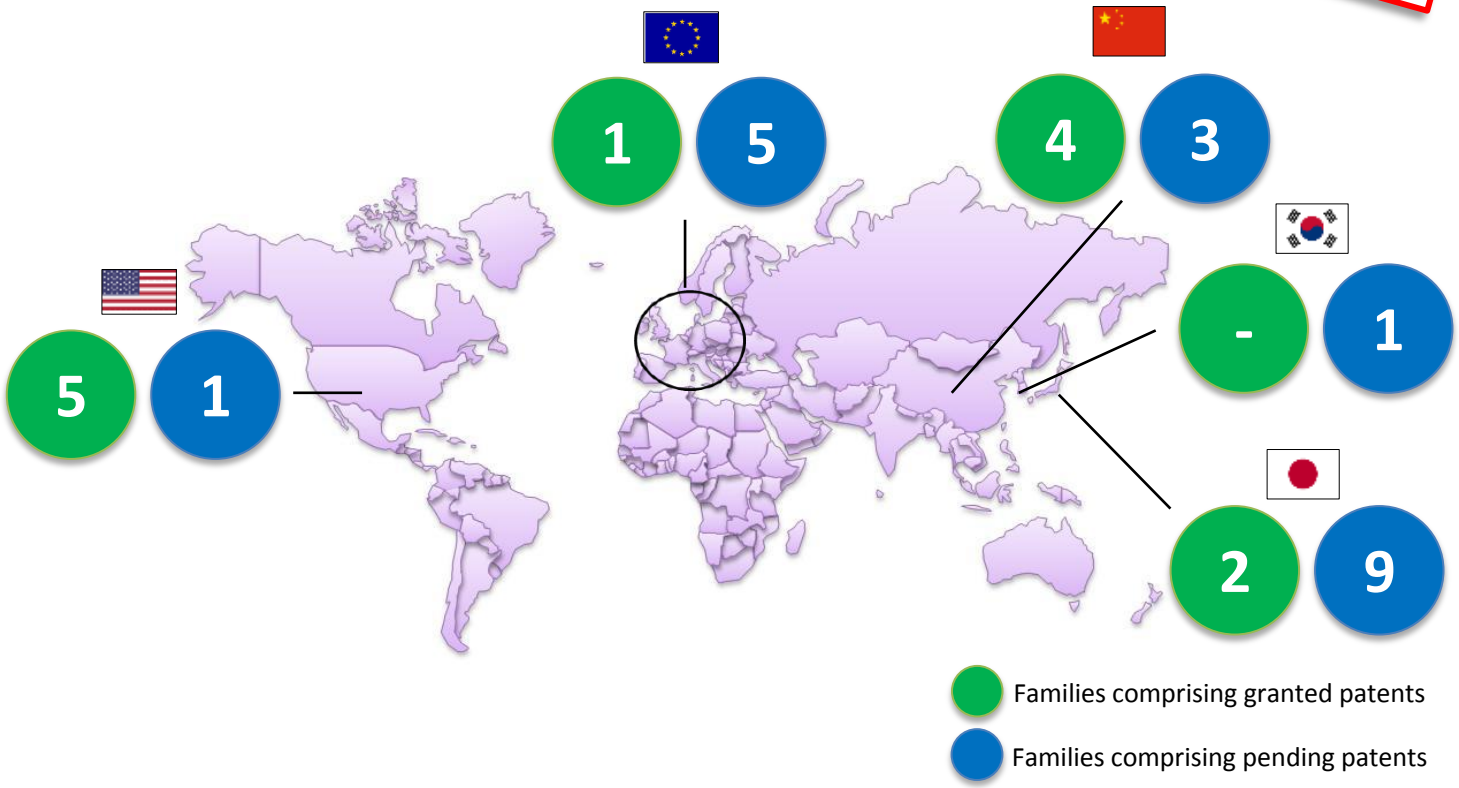
KEY PLAYERS

APPLICANT XXX

Summary of applicant's patent portfolio

Large portfolio	**2003** Oldest priority date	**7** Patent average age
35 Families	**284** Patents	**EP, CN, US, JP** Main countries of filings
29 Granted patents	**69** Pending applications	**Low** Portfolio Strength
Low IP Blocking potential	**Medium** Leadership	

Map of granted and pending patents



The patent portfolio of this company is mainly focused on :

MATERIAL	DISEASE	DIAGNOSTIC TECHNIQUE
Polymer	Infectious disease	Nucleic acid amplification
		Cell-based assay

EXCEL DATABASE

Containing all the patents analyzed in this report with technology segmentation

REPORT SAMPLE

This database allows multi-criteria searches and includes patent publication number, hyperlinks to the original documents, priority date, title, patent assignees, and legal status for each member of the patent family.

										MATERIAL					DISEASE							
FAMILY NUMBER (FamPat Databas	PATENT NUMBER	PATENT ASSIGNEE	PRIORITY DATE	TITLE	PDF LINK	ABSTRACT	LEGAL STATUS	ACTUAL OR EXPECTED EXPIRATION DATE	All material	Polymer	Glass	Silicon	Paper	All disease	Cancer	Genetic disorders	Infectious disease	Infectious disease : HIV	Infectious disease : Malaria	Neuro-degenerative disease	Diabetes
7453	WO2		2014-05-11	Flexible	Open	A flexible, i	LEGAL DETAILS	2017-11-11	X				X	X	X						
7453	US2		2014-05-11	Flexible	Open	A flexible, i	LEGAL DETAILS	2035-05-07	X				X	X	X						
7441	US2		2006-02-15	Method	Open	A method a	LEGAL DETAILS	2027-02-13	X	X				X			X	X			
7431	US9		2006-02-02	Microflu	Open	A portable,	LEGAL DETAILS	2032-11-01						X			X	X			
7431	US2		2006-02-02	Microflu	Open	A portable,	LEGAL DETAILS	2027-02-02						X			X	X			
7430	IN20		2013-09-17	Multipl	Open	The present	LEGAL DETAILS	2033-09-17													
7429	WO2		2015-04-02	Three-d	Open	A pop-up th	LEGAL DETAILS	2018-10-02	X				X	X							X
7429	WO2		2015-04-03	Devices	Open	Methods, de	LEGAL DETAILS	2018-10-03	X	X				X	X		X	X			
7429	US2		2015-04-03	Molecu	Open	The inventio	LEGAL DETAILS	2036-03-31						X	X	X					
7429	WO2		2015-04-03	Molecu	Open	The inventio	LEGAL DETAILS	2018-10-03						X	X	X					
7428	US2		2015-03-31	Nanoel	Open	An electrica	LEGAL DETAILS	2036-03-31													
7428	WO2		2015-03-31	Nanoel	Open	The present	LEGAL DETAILS	2018-09-30													
7428	WO2		2015-04-02	Portabl	Open	A portable d	LEGAL DETAILS	2018-10-02						X							X
7422	CN2		2016-05-05	Total in	Open	The present	LEGAL DETAILS	2026-05-05						X	X						
7419	WO2		2015-03-13	Testing	Open	A testing de	LEGAL DETAILS	2018-09-13	X	X											
7418	CN2		2016-04-18	Microflu	Open	The present	LEGAL DETAILS	2026-04-18						X			X				
7416	US2		2015-03-13	Method	Open	The detectio	LEGAL DETAILS	2036-03-11						X			X	X	X		
7414	WO2		2015-03-10	Microflu	Open	Provided he	LEGAL DETAILS	2018-09-10	X	X											
7414	WO2		2015-03-06	System,	Open	Detecting p	LEGAL DETAILS	2018-09-26	X	X				X			X				X
7411	CN1		2016-05-24	Method	Open	The present	LEGAL DETAILS	2036-05-24	X	X											
7411	CN1		2016-03-07	Optical	Open	The present	LEGAL DETAILS	2036-04-20													
7410	WO2		2015-03-01	Apparat	Open	Certain emb	LEGAL DETAILS	2018-09-01	X	X			X	X	X		X		X		
7404	CN1		2016-03-29	Single c	Open	The present	LEGAL DETAILS	2036-03-29						X	X						
7402	WO2		2015-02-23	Cell ima	Open	Methods, sy	LEGAL DETAILS	2019-03-08						X	X						
7400	CN1		2016-05-08	Integrat	Open	The present	LEGAL DETAILS	2036-05-08													
7398	CN1		2015-01-18	Fluid tra	Open	The present	LEGAL DETAILS	2035-01-18	X	X											
7398	CN1		2015-01-18	To ride	Open	The present	LEGAL DETAILS	2035-01-18	X	X											
7398	CN1		2015-01-18	In the s	Open	The present	LEGAL DETAILS	2035-01-18	X	X											
7398	CN1		2015-01-18	Variety	Open	The present	LEGAL DETAILS	2035-01-18	X	X											
7398	CN1		2015-01-18	Transpo	Open	The present	LEGAL DETAILS	2035-01-18	X	X				X			X	X			
7398	CN1		2015-01-18	Fluid dr	Open	The present	LEGAL DETAILS	2035-01-18	X	X				X			X	X			
7398	CN1		2015-01-18	Inexper	Open	The present	LEGAL DETAILS	2035-01-18	X	X											
7398	CN1		2015-01-18	Simulta	Open	The present	LEGAL DETAILS	2035-01-18	X	X											
7398	US2		2015-02-19	MELT-AI	Open	A low-melti	LEGAL DETAILS	2036-02-18													
7396	WO2		2015-02-16	Systems	Open	Provided he	LEGAL DETAILS	2019-04-22	X	X	X			X	X		X				
7396	WO2		2015-02-17	Microdr	Open	The present	LEGAL DETAILS	2018-08-17													
7390	CN1		2016-03-29	Circulat	Open	The present	LEGAL DETAILS	2036-03-29						X	X						
7386	CN1		2016-05-13	Chorion	Open	The present	LEGAL DETAILS	2036-05-13													
7382	WO2		2015-02-04	Method	Open	Methods, de	LEGAL DETAILS	2018-11-15	X	X				X	X	X					
7380	CN1		2016-05-05	Microflu	Open	The present	LEGAL DETAILS	2036-05-05													
7377	CA2		2013-05-07	Device t	Open	An integrate	LEGAL DETAILS	2034-05-07						X			X	X	X		
7377	WO2		2013-05-07	Device t	Open	An integrate	LEGAL DETAILS	2016-11-07						X			X	X	X		
7377	AU2		2013-05-07	Device fo	Open	An integrate	LEGAL DETAILS	2034-05-07						X			X	X	X		

ORDER FORM

Microfluidic Technologies for Diagnostic Applications – Patent Landscape Analysis 2017

Ref.:KM17001

SHIP TO
Name (Mr/Ms/Dr/Pr):
_____
Job Title:
_____
Company:
_____
Address:
_____
City:
_____
State:
_____
Postcode/Zip:
_____
Country:
_____
VAT ID Number for EU members:
_____
Tel:
_____
Email:
_____
Date:
_____

PAYMENT METHODS

Check

To pay your invoice using a check, please mail your check to the following address**:**

KnowMade S.A.R.L.
2405 route des Dolines, BP 65
06902 Valbonne Sophia Antipolis
FRANCE

Money Transfer

To pay your invoice using a bank money wire transfer please contact your bank to complete this process. Here is the information that you will need to submit the payment:

Payee: KnowMade S.A.R.L.
Bank: Banque populaire St Laurent du Var CAP 3000 - Quartier du lac- 06700 St Laurent du Var
IBAN: FR76 1560 7000 6360 6214 5695 126
BIC/SWIFT: CCBPFRPPNCE

Paypal

In order to pay your invoice via PAYPAL, you must first register at www.paypal.com. Then you can send money to the KnowMade S.A.R.L. by entering our E-mail address contact@knowmade.fr as the recipient and entering the invoice amount.

RETURN ORDER BY

E-mail: contact@knowmade.fr
Mail: KnowMade S.A.R.L. 2405 route des Dolines, 06902 Sophia Antipolis, FRANCE

PRODUCT ORDER

☐ **€4,990 – Single user license***
☐ **€5,990 – Corporate license**

For price in dollars, please use the day's exchange rate. For French customer, add 20% for VAT.

All reports are delivered electronically in pdf format at payment reception.

**Single user license means only one person at the companycan use the report. Please be aware that our publication will be watermarked on each page with the name of the recipient and of the organization (the name mentioned on the PO). This watermark will also mention that the report sharing is not allowed.*

I hereby accept Knowmade's Terms and Conditions of Sale
Signature:

Terms and Conditions of Sales

DEFINITIONS

"Acceptance": Action by which the Buyer accepts the terms and conditions of sale in their entirety. It is done by signing the purchase order which mentions "I hereby accept Knowmade's Terms and Conditions of Sale".

"Buyer": Any business user (i.e. any person acting in the course of its business activities, for its business needs) entering into the following general conditions to the exclusion of consumers acting in their personal interests.

"Contracting Parties" or "Parties": The Seller on the one hand and the Buyer on the other hand.

"Intellectual Property Rights" ("IPR") means any rights held by the Seller in its Products, including any patents, trademarks, registered models, designs, copyrights, inventions, commercial secrets and know-how, technical information, company or trading names and any other intellectual property rights or similar in any part of the world, notwithstanding the fact that they have been registered or not and including any pending registration of one of the above mentioned rights.

"License": For the reports and databases, 2 different licenses are proposed. The buyer has to choose one license:

1. One user license: a single individual at the company can use the report.
2. Multi user license: the report can be used by unlimited users within the company. Subsidiaries are not included.

"Products": Reports are established in PowerPoint and delivered on a PDF format and the database may include Excel files.

"Seller": Based in Sophia Antipolis (France headquarters), Knowmade is a technology intelligence company specialized in the research and analysis of scientific and technical information. We provide patent landscapes and scientific state of the art with high added value to businesses and research laboratories. Our intelligence digests play a key role to define your innovation and development strategy.

1. SCOPE

1.1 The Contracting Parties undertake to observe the following general conditions when agreed by the Buyer and the Seller. ANY ADDITIONAL, DIFFERENT, OR CONFLICTING TERMS AND CONDITIONS IN ANY OTHER DOCUMENTS ISSUED BY THE BUYER AT ANY TIME ARE HEREBY OBJECTED TO BY THE SELLER, SHALL BE WHOLLY INAPPLICABLE TO ANY SALE MADE HEREUNDER AND SHALL NOT BE BINDING IN ANY WAY ON THE SELLER.

1.2 This agreement becomes valid and enforceable between the Contracting Parties after clear and non-equivocal consent by any duly authorized person representing the Buyer. For these purposes, the Buyer accepts these conditions of sales when signing the purchase order which mentions "I hereby accept Knowmade's Terms and Conditions of Sale". This results in acceptance by the Buyer.

1.3 Orders are deemed to be accepted only upon written acceptance and confirmation by the Seller, within [7 days] from the date of order, to be sent either by email or to the Buyer's address. In the absence of any confirmation in writing, orders shall be deemed to have been accepted.

2. MAILING OF THE PRODUCTS

2.1 Products are sent by email to the Buyer:

- within [1] month from the order for Products already released; or
- within a reasonable time for Products ordered prior to their effective release. In this case, the Seller shall use its best endeavours to inform the Buyer of an indicative release date and the evolution of the work in progress.

2.2 Some weeks prior to the release date the Seller can propose a pre-release discount to the Buyer.

The Seller shall by no means be responsible for any delay in respect of article 2.2 above, and including in cases where a new event or access to new contradictory information would require for the analyst extra time to compute or compare the data in order to enable the Seller to deliver a high quality Products.

2.3 The mailing of the Product will occur only upon payment by the Buyer, in accordance with the conditions contained in article 3.

2.4 The mailing is operated through electronic means either by email via the sales department. If the Product's electronic delivery format is defective, the Seller undertakes to replace it at no charge to the Buyer provided that it is informed of the defective formatting within 90 days from the date of the original download or receipt of the Product.

2.5 The person receiving the Products on behalf of the Buyer shall immediately verify the quality of the Products and their conformity to the order. Any claim for apparent defects or for non-conformity shall be sent in writing to the Seller within 8 days of receipt of the Products. For this purpose, the Buyer agrees to produce sufficient evidence of such defects.

2.6 No return of Products shall be accepted without prior information to the Seller, even in case of delayed delivery. Any Product returned to the Seller without providing prior information to the Seller as required under article 2.5 shall remain at the Buyer's risk.

3. PRICE, INVOICING AND PAYMENT

3.1 Prices are given in the orders corresponding to each Product sold on a unit basis or corresponding to annual subscriptions. They are expressed to be inclusive of all taxes. The prices may be reevaluated from time to time. The effective price is deemed to be the one applicable at the time of the order.

3.2 Payments due by the Buyer shall be sent by cheque payable to Knowmade, PayPal or by electronic transfer to the following account:

Banque populaire St Laurent du Var CAP 3000 - Quartier du lac- 06700 St Laurent du Var
BIC or SWIFT code: CCBPFRPPNCE
IBAN: : FR76 1560 7000 6360 6214 5695 126

To ensure the payments, the Seller reserves the right to request down payments from the Buyer. In this case, the need of down payments will be mentioned on the order.

3.3 Payment is due by the Buyer to the Seller within 30 days from invoice date, except in the case of a particular written agreement. If the Buyer fails to pay within this time and fails to contact the Seller, the latter shall be entitled to invoice interest in arrears based on the annual rate Refi of the «BCE» + 7 points, in accordance with article L. 441-6 of the French Commercial Code. Our publications (report, database, tool...) are delivered only after reception of the payment.

3.4 In the event of termination of the contract, or of misconduct, during the contract, the Seller will have the right to invoice at the stage in progress, and to take legal action for damages.

4. LIABILITIES

4.1 The Buyer or any other individual or legal person acting on its behalf, being a business user buying the Products for its business activities, shall be solely responsible for choosing the Products and for the use and interpretations he makes of the documents it purchases, of the results he obtains, and of the advice and acts it deduces thereof.

4.2 The Seller shall only be liable for (i) direct and (ii) foreseeable pecuniary loss, caused by the Products or arising from a material breach of this agreement

4.3 In no event shall the Seller be liable for:

a) damages of any kind, including without limitation, incidental or consequential damages (including, but not limited to, damages for loss of profits, business interruption and loss of programs or information) arising out of the use of or inability to use the Seller's website or the Products, or any information provided on the website, or in the Products;

b) any claim attributable to errors, omissions or other inaccuracies in the Product or interpretations thereof.

4.4 All the information contained in the Products has been obtained from sources believed to be reliable. The Seller does not warrant the accuracy, completeness adequacy or reliability of such information, which cannot be guaranteed to be free from errors.

4.5 All the Products that the Seller sells may, upon prior notice to the Buyer from time to time be modified by or substituted with similar Products meeting the needs of the Buyer. This modification shall not lead to the liability of the Seller, provided that the Seller ensures the substituted Product is similar to the Product initially ordered.

4.6 In the case where, after inspection, it is acknowledged that the Products contain defects, the Seller undertakes to replace the defective products as far as the supplies allow and without indemnities or compensation of any kind for labor costs, delays, loss caused or any other reason. The replacement is guaranteed for a maximum of two months starting from the delivery date. Any replacement is excluded for any event as set out in article 5 below.

4.7 The deadlines that the Seller is asked to state for the mailing of the Products are given for information only and are not guaranteed. If such deadlines are not met, it shall not lead to any damages or cancellation of the orders, except for non-acceptable delays exceeding [4] months from the stated deadline, without information from the Seller. In such case only, the Buyer shall be entitled to ask for a reimbursement of its first down payment to the exclusion of any further damages.

4.8 The Seller does not make any warranties, express or implied, including, without limitation, those of saleability and fitness for a particular purpose, with respect to the Products. Although the Seller shall take reasonable steps to screen Products for infection of viruses, worms, Trojan horses or other codes containing contaminating or destructive properties before making the Products available, the Seller cannot guarantee that any Product will be free from infection.

5. FORCE MAJEURE

The Seller shall not be liable for any delay in performance directly or indirectly caused by or resulting from acts of nature, fire, flood, accident, riot, war, government intervention, embargoes, strikes, labor difficulties, equipment failure, late deliveries by suppliers or other difficulties which are beyond the control, and not the fault of the Seller.

6. PROTECTION OF THE SELLER'S IPR

6.1 All the IPR attached to the Products are and remain the property of the Seller and are protected under French and international copyright law and conventions.

6.2 The Buyer agreed not to disclose, copy, reproduce, redistribute, resell or publish the Product, or any part of it to any other party other than employees of its company. The Buyer shall have the right to use the Products solely for its own internal information purposes. In particular, the Buyer shall therefore not use the Product for purposes such as:

- Information storage and retrieval systems;
- Recordings and re-transmittals over any network (including any local area network);
- use in any timesharing, service bureau, bulletin board or similar arrangement or public display;
- Posting any Product to any other online service (including bulletin boards or the Internet);
- Licensing, leasing, selling, offering for sale or assigning the Product.

6.3 The Buyer shall be solely responsible towards the Seller of all infringements of this obligation, whether this infringement comes from its employees or any person to whom the Buyer has sent the Products and shall personally take care of any related proceedings, and the Buyer shall bear related financial consequences in their entirety.

6.4 The Buyer shall define within its company point of contact for the needs of the contract. This person will be the recipient of each new report in PDF format. This person shall also be responsible for respect of the copyrights and will guaranty that the Products are not disseminated out of the company.

7. TERMINATION

7.1 If the Buyer cancels the order in whole or in part or postpones the date of mailing, the Buyer shall indemnify the Seller for the entire costs that have been incurred as at the date of notification by the Buyer of such delay or cancellation. This may also apply for any other direct or indirect consequential loss that may be borne by the Seller, following this decision.

7.2 In the event of breach by one Party under these conditions or the order, the non-breaching Party may send a notification to the other by recorded delivery letter upon which, after a period of thirty (30) days without solving the problem, the non-breaching Party shall be entitled to terminate all the pending orders, without being liable for any compensation.

8. MISCELLANEOUS

All the provisions of these Terms and Conditions are for the benefit of the Seller itself, but also for its licensors, employees and agents. Each of them is entitled to assert and enforce those provisions against the Buyer.

Any notices under these Terms and Conditions shall be given in writing. They shall be effective upon receipt by the other Party.

The Seller may, from time to time, update these Terms and Conditions and the Buyer, is deemed to have accepted the latest version of these terms and conditions, provided they have been communicated to him in due time.

9. GOVERNING LAW AND JURISDICTION

9.1 Any dispute arising out or linked to these Terms and Conditions or to any contract (orders) entered into in application of these Terms and Conditions shall be settled by the French Commercial Courts of Grasse, which shall have exclusive jurisdiction upon such issues.

9.2 French law shall govern the relation between the Buyer and the Seller, in accordance with these Terms and Conditions.