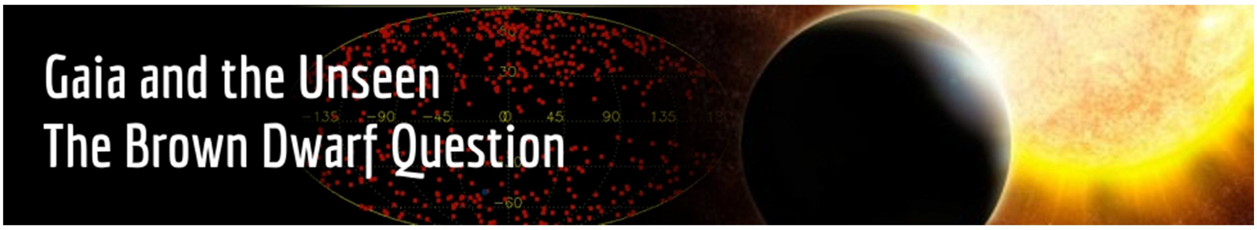

ABSTRACTS

TALKS
ordered alphabetically by surname

1. **France Allard**, CRAL/ENS, Lyon, France
   The BT-Settl models for Brown Dwarfs
   Brown dwarfs behave like stars when they are young and/or massive and like planets when they are evolved and/or low mass. We present the BT-Settl model atmosphere grid for brown dwarfs that span these regimes, as well as new consistent interior and evolution tracks. We explore based on these models the detectability of brown dwarfs with GAIA.

2. **Juan Carlos Beamin**, P. Universidad Catolica de Chile/ESO
   Brown dwarfs with the VVV survey
   The Vista Variables in the Via Lactea survey (VVV) is a near-IR ESO public survey devoted to study the Galactic bulge and southern inner disk covering 560 sq. degrees on the sky. This multi-epoch and multi-wavelength survey has helped to discover the first brown dwarfs towards the Galactic center, one of the most crowded areas in the sky, and several low mass companions to known nearby stars. The multi-epoch information has allowed us to calculate precise parallaxes, and to put some constraints on the long-term variability of these objects. We expect to discover a few more dozens of brown dwarfs.
   The VVV survey complements nicely the Gaia mission, observing for few more years the same fields at different wavelengths. It also provides observational basis to study the long-term variability of brown dwarfs.

3. **John Bochanski**, Haverford College, PA, USA
   1% astrometry +10m/s velocities on 1000's of UCDs, what can we learn

4. **François Bouchy**, LAM, Marseille, France and Geneva Observatory, Switzerland
   Follow-up of transiting Brown Dwarf companions identified with GAIA
   Several transiting Brown Dwarfs have been discovered these last years, thanks to the radial velocity follow-up of transiting exoplanet candidates identified by CoRoT and Kepler space missions. GAIA will discover BD companions orbiting bright stars both by astrometry and by radial velocity. Some of them, especially those at short orbital period and/or those with low orbital inclination, will have a significant probability to transit their host stars. Complementary ground based observations will permit to identify and to characterize transiting Brown Dwarfs. These observations will include :
   - Additional Radial Velocities to revise orbital parameters and ephemeris,
   - High precision photometry to catch the potential transit and to measure BD radius,
   - High S/N high resolution spectroscopy to derive parameters of central host star,
   - Rossiter-McLaughlin measurements to derive spin-orbit obliquity.

   Complementary space-based observations with TESS (NASA) and CHEOPS (ESA) should also be used for high precision photometry. Such complementary observations will permit to derive the mass, radius, eccentricity, obliquity, and density of transiting Brown Dwarfs and to map the gap between massive planets and low-mass stars.

5. **Hervé Bouy**, CAB (CSIC-INTA), Madrid, Spain
   Complementing Gaia from the ground
   Reaching G~20mag, Gaia will discover thousands of nearby UCD. It will nevertheless not be sensitive to the coolest nearby sources, and will also miss the least massive members of nearby star forming regions. I will present the results of the DANCe survey in the Pleiades and IC2602 clusters. The DANCe survey aims at complementing Gaia beyond its limit of sensitivity and down the planetary mass domain. Using ground based observations, we derive proper motions with an accuracy as good as 0.3mas/yr up to i=23~24mag. These accurate measurements allow us to identify the members, and study the properties of the clusters over the entire mass spectrum, from the most massive stars down to a few Jupiter masses.

6. **Esther Buenzli**, MPIA, Heidelberg, Germany
   Cloud structure of brown dwarfs from spectral variability observations
   Recent discoveries of variable brown dwarfs have provided us with a new window into their three dimensional cloud structure. The strongest variables are found at the L/T transition, where the cloud cover is thought to break up. However, variability at lower level has been found to occur also for both cloudy L dwarfs and (mostly) cloud free mid T dwarfs. I will discuss results from several HST programs measuring the spectral variability of brown dwarfs from mid L to mid T type in the near infrared, aimed at determining both the frequency and diversity of heterogeneous atmospheres.

7. **Ben Burningham**, Hertfordshire University, UK
   Who wants a millions brown dwarfs, and why?
   I will review the history of identifying and characterizing brown dwarfs in large scale surveys, and present an overview of current and near-future prospects that present the possibility of identifying a million brown dwarfs. This offers the opportunity for a transition to studying substellar science with real statistical power. With an eye on the key unanswered questions in substellar science, and by reflecting on the experience gained in other areas of astrophysics, I will explore how these new data sets can be best exploited in the GAIA era.

8. **Jose A. Caballero**, CAB (CSIC-INTA), Madrid, Spain
   Gaia and brown dwarfs from Spain
   The 'BajaMasa' working group of the 'REG', the Spanish Gaia Network, consists of over 20 researchers on low-mass stars, brown dwarfs and exoplanets. As the coordinator of the working group, I will review our research lines related to Gaia. Apart from characterization of M dwarfs in the field and discovery/follow-up of exoplanets, we also have room for studying brown dwarfs and ultracool dwarfs. Besides, I will briefly give some ideas on what Gaia can do on brown dwarfs in sigma Orionis or what CARMENES can do in nearby bright M dwarfs.

9. **Sarah Casewell**, Leicester University, UK
   Gaia and white dwarf + brown dwarf binaries
   Only ~0.5% of brown dwarfs have a white dwarf companion, and the number of systems that have undergone common envelope evolution is even fewer. However, white dwarf companions can provide a wealth of information about the system, allowing brown dwarf parameters to be inferred.
   The Gaia parallax of white dwarfs, when combined with proper motion and multi-colour photometry (Gaia won't measure the RV of white dwarfs) will allow fundamental WD parameters (mass, radius, cooling time, initial mass) to be calculated, thus also determining the age of the brown dwarf in the system.
   Notable examples where this technique has been used are for WD0837-185B, a ~30 MJup brown dwarf orbiting a high mass white dwarf in the Praesepe cluster, and WD0806-661B, possibly the coolest brown dwarf known.

10. **Jos de Bruijne**, ESA-ESTEC, Netherlands
    Status of Gaia
    I will review the current status of the Gaia mission.

11. **Yifat Dzigan**, Weizmann Institute of Science, Israel
Finding Hot Jupiters by Gaia photometry using the Directed follow-up strategy
Transiting exoplanets, and in particular Hot Jupiters around bright stars, are key ingredients for understanding planetary formation and migration theories, statistics of planetary properties and planetary dynamics, since they are most favorable for observational follow-up study.
I will present a novel approach to use low-cadence photometric surveys, such as the promising Gaia Space mission, for exoplanetary transit search.
We find that even if transits are undetectable in the sparsely sampled data, the "Directed Follow-Up strategy" (DFU) can be used to choose preferred times for follow-up observations that will maximize the detection probability.
We examined numerous simulations, and found that Gaia's yield will potentially reach a few thousands of new transiting planets that otherwise can be easily missed due to the low-cadence sampling. Thus, the strategy promises that Gaia will best utilize its photometric potential and have a significant impact on the exciting field of transiting exoplanets.

12. **Neil Wyn Evans**, IoA, Cambridge, UK
Gaia and microlensing of brown dwarfs
I review the astrometric microlensing effect, and its importance for brown dwarf studies. GAIA is the first instrument with the capability of measuring the mass locally in very faint objects such as brown dwarfs. The all-sky source-averaged astrometric microlensing optical depth is ~2.5x10-5. Some ~25000 sources will have a significant variation of the centroid shift, together with a closest approach, during the lifetime of the mission. The mass of the lens can be calculated to good accuracy if the lens is nearby so that the angular Einstein radius is large; or if the Einstein radius projected on to the observer plane is approximately an astronomical unit; or if the duration of the astrometric event is long or if the source star is bright. There are roughly 2000 high-quality events, which are dominated by disc lenses within a few tens of parsecs and source stars within a few hundred parsecs.

13. **Jacqueline Faherty**, Carnegie Institute of Washington, DTM, DC, USA
Age determination for Brown Dwarfs
Brown dwarfs are notoriously difficult to age date as they lack stable Hydrogen burning. However precise and accurate ages for individual sources are required to determine masses. In this session, we will review the best techniques to age-date brown dwarfs and discuss how Gaia may contribute to breaking the age/mass degeneracy. We will end with a round table discussion that will lend well to a brainstorming session on new/novel ideas for how Gaia can contribute to the brown dwarf age problem.

14. **Christiane Helling**, St. Andrews University, UK
Expect the unexpected: non-equilibrium processes in Brown Dwarf model atmospheres
Brown Dwarf atmosphere are a chemically extremely rich, one example being the formation of clouds from an oxygen-rich gas mixture. Today, cloud formation modelling is an integral part of any atmosphere simulation used to interpret spectral observations and to determine fundamental parameters (e.g. log(g), Teff). In this talk, I would like to advocate two ideas:
A) The use of a multitude of model families to determine fundamental parameters with realistic confidence interval.
B) To keep an eye on the unexpected, like for example, ionisation signatures in a seemingly unionized atmosphere.

15. **Derek Homeier**, CRAL/ENS, Lyon, France
Models across the substellar boundary
As Gaia probes populations beyond the Hydrogen-burning Minimum Mass, stellar models will have to follow suit to guide the analysis of its data. PHOENIX atmosphere models form part of the backbone for the Gaia stellar classification machine for main sequence and giant stars down to 3000 K effective temperature. I will present the most recent, homogenous extension of this atmosphere grid and associated stellar structure and

evolution models down to, and past the end of the main sequence. I will also discuss the state of the art of atmospheric modelling for brown dwarfs and their role in studying different substellar populations.

16. **Viki Joergens**, MPIA, Heidelberg, Germany
Brown dwarf binaries with GAIA
GAIA will allow the detection of astrometric orbits of spectroscopic brown dwarf binaries and, therefore to provide valuable dynamical mass determinations in the substellar and two-mass stellar regime. We will review our long-term high-resolution survey for spectroscopic binaries among young brown dwarfs and very low-mass stars and discuss the most promising candidates for GAIA follow-up observations. Amongst others, we solved the radial velocity orbits for two long-period spectroscopic binaries, and predicted the astrometric signal with respect to GAIA observations.

17. **J. Davy Kirkpatrick**, CalTech, CA, USA
Unanswered Questions in Brown Dwarf Research
The first L dwarf was discovered in 1988, the first T dwarf in 1995, and the first Y dwarf in 2010. In the intervening years, objects cooler than spectral type M have lost many of their secrets: Namely, we have determined the frequency of occurrence of these objects in the Solar Neighborhood; we have come to learn more about the importance of dust and clouds as a function of temperature, gravity, and metallicity; we have learned that extrasolar planets and brown dwarfs share many common traits; and we have even discovered that the third closest "stellar" system to the Sun is comprised of an L+T binary. Despite these successes, several important questions in brown dwarf research remain unanswered. In this talk I will discuss those I regard as the top questions that the Gaia mission can help answer.

18. **Nadia Kudryavtseva**, Curtin University, Australia
Brown dwarfs at low radio frequencies – first results from the Murchison Widefield Array in Western Australia
The flaring radio emission from brown dwarfs and ultracool dwarfs is a powerful diagnostic of magnetic field strengths and topologies. Most of the recently found brown dwarfs in radio are very faint at GHz frequencies. Therefore, observations at low radio frequencies (< 500 MHz) provide a powerful tool for unveiling the physics of brown dwarfs due to steep spectrum of the sources. The previous generation of telescopes operating at low radio frequencies did not have enough sensitivity and resolution. However, the new generation, such as the Murchison Widefield Array, located in Australia (started operations in 2013), has extremely large field of view (610 square degrees) and high sensitivity (10 mJy), which makes is a great telescope for studying brown dwarfs. I will talk about study of variability of brown dwarfs at low radio frequencies in a 610 square degrees field centred on Pictor A. The observations were performed at 154 and 185 MHz between March 2010 and September 2011, spanning more than 7.5 hours of Murchison Widefield Array prototype. The study showed that 75% of variable sources on timescales of minutes to days are brown dwarfs, for the first time demonstrating that the brown dwarfs are the most common variable sources at low radio frequencies on timescales minutes to days. I will also present recent results of the ongoing 600 hours key science program "Search for transient and variable sources in the EOR fields with Murchison Widefield Array". During this program, 176 known brown dwarfs are being constantly monitored with high cadence. I will discuss variability and statistical properties of brown dwarf population at low radio frequencies.

19. **Valeri Makarov**, USNO, DC, USA
Astrometry of brown dwarfs and nearby young associations
The most luminous and easily detected brown dwarfs are the young objects in the nearest moving groups and associations, such as the TWA. Detection of candidate co-moving young brown dwarfs is possible today by astrometric means, such as the convergent point mapping of proper motions or computer vision routines, but represents some technical difficulties due to large volumes of data and low rates of positives. The prospects of pre-Gaia identification of young group members based on Pan-STARRS and WISE data are discussed, as well as the suite of available algorithms.

20. **Lison Malo**, CFHT, Montreal University, Canada

Searching for young objects in the Solar neighborhood

We present a new method based on a Bayesian analysis to identify new members of nearby young kinematic groups. The analysis minimally takes into account the position, proper motion, magnitude and color of a star, but other observables can be readily added if desired (e.g. radial velocity, distance). It returns a probability of the objects (star or brown dwarf) being member of a given group together with a most likely distance and radial velocity. When applied to known members, the statistical distances and radial velocities agree with the measured values within 1.9 km/s and 10%, respectively. We use this method to find new young low-mass stars and brown dwarfs in the β Pictoris and AB Doradus moving groups and in the Tucana-Horologium, Columba, Carina and Argus associations.

21. **Eric Mamajek**, Rochester University, NY, USA

The Pre-GAIA State of Young Stellar Groups in the Solar Vicinity

The Hipparcos astrometric and ROSAT X-ray missions radically changed our picture of recent star-formation in the solar neighborhood within ~<100 pc of the Sun and in the nearest OB associations. Several new young stellar groups (mostly with ages $<10^8$ yr) have been discovered within a 100 pc of the Sun – mostly aided by Hipparcos mas-level astrometry. The youngest of the nearby groups (β Pic, TW Hya, η Cha, ε Cha) appear to be outlying subgroups of Sco-Cen, the nearest OB association. Young substellar objects and low-mass stars which are probable members of nearby young groups have been discovered in increasing number in recent years. These objects are becoming astrophysical benchmark objects of known age which provide interesting comparisons to exoplanets. I'll summarize the current physical parameters of these nearby young stellar groups, and how GAIA astrometry of these samples will inform us about star formation in general. I'll also speculate on what our picture of young stellar populations in the solar vicinity may look like in a decade post-GAIA.

22. **Elena Manjavacas**, MPIA, Heidelberg, Germany

New constrains on the formation and settling of dust in the atmospheres of young M and L dwarfs

At young ages, low surface gravity affects the atmospheric properties of ultracool dwarfs. The impact on medium-resolution near-infrared spectra has only been slightly investigated at the M-L transition so far. We obtain six near-infrared, medium resolution (R = 1500), spectra of young M9.5-L3 dwarfs. We build an age-sequence of spectra of optically classified M9.5 dwarfs and identified age-sensitive features. We also use the spectra and complementary photometry to test the 2010 and 2013 releases of the BT-SETTL models. We find that the models can reproduce the spectral energy distributions and the JHK band spectra of young L2-L3 dwarfs for close temperatures. But we find that 1/ these models give a spread of temperatures at the M-L transition and 2/ that they do not fit the spectral energy distributions and the individual J, H and K band spectra simultaneously. This inconsistency likely arises from a deficit of dust at high altitude in the cloud models. The distances provided by Gaia will help to constrain the physical characteristics of our objects, which would become better templates to contribute to constrain BT-SETTL atmospheric models.

23. **Simon Murphy**, ARI/ZAH, Heidelberg, Germany

A Pre-Gaia search for low-mass members of the Octans association

The under-studied Octans association is one of several young moving groups in the southern sky and a potential new target for circumstellar disk studies. Unfortunately, its age, distance and very existence as a moving group remain poorly constrained due to a lack of low-mass stars. To expand its membership and better determine these important parameters, we have begun a programme to identify new K and M-type Octans members in multi-wavelength all-sky surveys (e.g. SPM4, GALEX, 2MASS, WISE). In the absence of a robust definition for the group, and accurate distances and radial velocities (e.g. from Gaia) this problem is non-trivial. I will present our selection techniques and how they may be applied to preliminary Gaia data in the coming years, as well as first results from spectroscopic observations scheduled for January 2014.

24. **Richard Parker**, ETH Zürich, Switzerland and Liverpool JMU, UK
Probing brown dwarf formation mechanisms with Gaia
One of the fundamental questions in star formation is whether brown dwarfs form more like stars, or rather like giant planets. One way of addressing this question is to search for differences between the spatial distributions of brown dwarfs and stars in star-forming regions, clusters and associations. Any differences in the spatial distributions would suggest that they do form via a mechanism distinct from stars, although thus far the evidence is not conclusive. In this contribution, I will demonstrate that dynamical interactions in star-forming regions add an extra complication, but that Gaia will place such strong constraints on the formation histories of clusters and associations that we will be able to answer the question of whether or not brown dwarfs form in a different way to stars in nearby star-forming regions.

25. **Céline Reylé**, UTINAM, Besançon Observatory, France
The luminosity and mass function of field brown dwarfs
Thanks to recent and ongoing large scale surveys, thousands of brown dwarfs have been discovered in the last decade. Large and homogeneous sample can be used to constrain the field brown-dwarf luminosity function and mass function. I will present a complete and well defined sample of 102 ultracool dwarfs drawn for the Canada France Brown Dwarf Survey for cool brown dwarfs conducted with the MegaCam camera on the Canada-France-Hawaii Telescope telescope.
This sample is used to compute the luminosity function and space density of field dwarfs, and to investigate the mass function. I will compare with other determinations. The uncertainties are quite large and the comparison with the brown dwarf mass function in star clusters is puzzling. I will discuss how Gaia can bring important clues on that topics.

26. **Adric Riedel**, Hunter College/AMNH, New York, NY, USA
Kinematics and Luminosities of brown dwarfs with the BDNYC group
Our quest is nothing less than to understand what brown dwarfs are, what they're made of, how they formed, and where they come from. Our methods are multi-wavelength and numerous. Our science is eagerly awaiting the Gaia results. But even with parallaxes and precise astrometry of dozens of brown dwarfs on the horizon, there is still a need for spectroscopic observations to power our studies of brown dwarfs. We will discuss our attempts to locate and confirm brown dwarf members of nearby young moving groups via new and more careful kinematic analyses, our work on luminosities of brown dwarfs via SED fitting, and their continued importance in the age of Gaia.

27. **Johannes Sahlmann**, ESA/ESAC, Madrid, Spain
Astrometric planet search around southern ultracool dwarfs
I will present the results of the first two years of our ground-based survey of 20 nearby M8-L2 dwarfs using FORS2/VLT. The average astrometric accuracy is 150 micro-arcseconds and I will show how we use this data to determine trigonometric parallaxes with uncertainties of 0.1 mas, to discover tight ultracool binaries, and to constrain the occurrence of giant planets at intermediate separation around M8-L2 dwarfs. Finally, I will discuss our project in the context of the expected Gaia results.

28. **Luis M. Sarro**, UNED, Madrid, Spain
The search for ultra-cool dwarfs in the Gaia DPAC
In this talk I will explain how the Gaia DPAC (Data Processing and Analysis Consortium) prepared for the detection and characterization of ultra-cool dwarfs. I will explain what we did to estimate the number of dwarfs that Gaia will detect in each spectral type, and our expectations regarding known clusters and the field.

29. **Sarah Jane Schmidt**, Ohio State University, Columbus, OH, USA
Examining the Age Activity Relationship of Ultracool Dwarfs with GAIA
For solar-type stars, a relationship between magnetic activity and age can be used to estimate stellar ages. For ultracool dwarfs, the relationship between quiescent activity (as traced by Hα emission) and age is less direct. We suspect that ultracool dwarfs follow the same activity/age pattern as M dwarfs, which emit Hα for 1-8 Gyr

then become inactive. There is evidence for a similar activity/age pattern for flaring M dwarfs, but with a flare activity lifetime that is smaller than the quiescent activity lifetime. This flare activity lifetime is not well understood, but the presence and strength of flares could be a useful age diagnostic for ultracool dwarfs. Using GAIA, we can combine flare detections in repeat photometry with precise kinematics to examine the relationship between the ages of ultracool dwarfs and their flare rates. These ages could aid in the separation of stars/brown dwarf separation at >1 Gyr.

30. **Richard Smart**, INAF-OATo, Torino, Italy
Brainstorming Gaia and Brown Dwarfs
The scope for advances in our understanding of brown dwarfs provided by the Gaia mission is varied and widespread. Here we will split the participants into small groups of mixed experience, expertise and origin to brain storm over the many possibilities being brought by this mission. The results form the mini groups will be compiled and presented in a later session.

31. **Alessandro Sozzetti**, INAF-OATo, Torino, Italy
Star + Brown Dwarf, Brown Dwarf + Planet systems in DPAC
I will describe the elements of the Gaia DPAC data processing chain that will deal with deriving astrometric orbits for non-single stars within the realm of Coordination Unit 4, with a focus on the strengths and challenges of the chosen approach. I will then outline some of the key science topics that might be addressed using the potential harvest of astrometrically detected brown-dwarf companions to normal stars and planetary-mass companions to brown dwarfs.

32. **Mark Taylor**, Bristol University, UK
Exploring Gaia data with TOPCAT and the Virtual Observatory
Discovering BDs from Gaia data will require careful analysis of both the Gaia archive itself and its correspondence with other available catalogue and spectral data. The Virtual Observatory (VO) is a framework for accessing astronomical data from remote archives in a uniform way, and VO protocols are the principal way in which Gaia data will be exposed to queries. VO-aware client applications can thus provide seamless access to Gaia and other data sets, giving a platform for combining data to extract scientific results. In this hands-on session I will introduce TOPCAT, an established VO-aware tool for manipulation and analysis of catalogue data, whose capabilities include visualization, selection and cross-matching. I will also explain the use of relevant VO protocols, in particular TAP/ADQL (Table Access Protocol and the associated SQL-like language Astronomical Data Query Language) to make simple and complex queries to Gaia-like catalogues, from TOPCAT and other tools.

33. **Carlo Viberti**, Spaceland, Torino, Italy
SpaceLand

34. **ZengHua Zhang**, Instituto de Astrofísica de Canarias, Santa Cruz de Tenerife, Spain
Halo brown dwarf and Gaia potential
Brown dwarfs of the Galactic halo are rare compared to their counterparts of the Galactic disc. Our knowledge of halo brown dwarfs are limited due to the lack of known halo brown dwarfs and well tested models. I will summarise the known halo brown dwarf sample. I will report our latest discovery of new halo brown dwarfs. Our targets are selected from UKIDSS and SDSS, and followed up with large telescopes (VLT, GTC and Magellan). Our new discovery has largely increased the sample of known halo brown dwarfs. I will discuss the spectral signature of halo brown dwarfs. I will also discuss the substellar subdwarf gap between low mass stars and massive brown dwarfs. Then I will discuss how Gaia will help us to understand halo brown dwarf population, and how halo brown dwarfs could help up to understand the evolution of brown dwarfs and Galactic halo.

POSTERS
ordered alphabetically by surname

1. **Amelia Bayo**, MPIA, Heidelberg, Germany
   Physical parameters of late-type M members of the Chamaleon I Dark Cloud and TW Hydrae Association: dust settling, age dispersion and activity
   Although mid- and late spectral type M dwarfs are the most common stars in our stellar neighborhood our knowledge of these objects is still pretty limited. Open questions of these fully convective objects include the evolution of their angular momentum, internal structures, dust settling in their atmospheres, age dispersion within clusters and associations. On top of this, at young ages, late-type M sources have masses below the hydrogen burning and therefore are key objects to settle down the debate on the brown dwarf mechanism of formation. The goal of this work is to determine and study in detail the physical parameters of two samples of young, late M-type sources (mix of very low-mass stars and brown dwarfs) belonging to either the Chamaeleon I Dark Cloud (~1-3Myr) or the TW Hydrae Association (~8-20Myr) and compare them with the results obtained in the literature for other young clusters and also for older, field, dwarfs. On the one hand we have used multi-wavelength photometry to construct and analyze SEDs to determine general properties of both the photosphere (via comparison with synthetic models) and disk presence. On the other hand we have used low resolution optical and near-infrared spectroscopy to study activity, accretion, gravity sensitive and effective temperature indicators (via comparison with templates as well as with theoretical models) from a comprehensive point of view. We propose a VO-based spectral index that to determine spectral types and distinguish between young and old populations. We have derived physical parameters for all sources using different techniques and regardless of the technique used we find the already common feature/problem of the age/luminosity spread on both samples. In particular, in Chamaeleon I, we highlight two brown dwarfs (Cha Hα 8 and Cha Hα 11) that showing very similar temperatures display clearly different surface gravities. A possible explanation for this difference is that Cha Hα 11 could be a candidate to have undergone extreme early accretion. Finally we also show how, despite large improvement in the dust treatment from the new collections of models (in particular the BT-Settl collection), there is still room for further progress in the simultaneous reproduction of the optical and near-infrared features of these cold young objects.

2. **Aldo Stefano Bonomo**, INAF-OATo, Torino, Italy
   Filling the radius-mass diagram of brown dwarfs with the Kepler space telescope and the SOPHIE@OHP spectrograph
   The radial-velocity monitoring of Kepler giant planetary candidates with the SOPHIE spectrograph at the Observatoire de Haute-Provence has led to the discovery of two brown dwarfs, KOI-205 b and KOI-415 b, and an 18 M_Jup object in the so-called brown-dwarf desert, KOI-423 b. We discuss their properties in the light of a new recent combined analysis of Kepler short-cadence data and SOPHIE radial-velocity measurements, and in the context of the Gaia space mission.

3. **Neil Cook**, Hertforshire University, UK
   A Method for Identifying M dwarfs with Ultra Cool Companions in 2MASS and WISE
   Locating unresolved ultra cool companions to M dwarfs is important to enable dynamical mass and transit radii tests of brown dwarf models, identifying warm exoplanets and, constraining planet formation models. The recent Wide-Field Infrared Survey Explorer all sky data release combined with the Two Micron All Sky Survey (2MASS) provides unprecedented near-to-mid infrared multi-band coverage for all bright M dwarfs across the sky. We present an optimized method for identifying brown dwarf and exoplanet companions to very low mass stars. We identify an all sky sample of bright M dwarfs based on optical and near-infrared colours, reduced proper motion, with strict E(H-W2) constraints and near minus mid infrared photometric uncertainty less than 0.04. We hunt for excess in mid infrared colours, and comparison samples of other M dwarfs from common multi-colour parameter-space using near infrared colours. We then provide spectroscopic constraints needed to further the selection process for immediate low resolution follow up. The best candidates will then be followed up with adaptive optics, radial velocities, and light curves (for transit) where appropriate. We present the method used and our preliminary candidates.

4. **Christine Ducourant**, LAB, Bordeaux University, France
Trigonometric parallaxes of cool brown dwarfs
Brown dwarfs are extremely important objects to our understanding of stellar and planetary formation and evolution. Lying at the limit between the coolest stars and the giant planets, they are poorly understood and the atmospheric models of such objects are imprecise. Beyond this population, very cool brown dwarfs (Teff<300 K) were recently discovered of new spectral class (T and Y dwarfs). A precise distance is the fundamental parameter to be able to derive their masses, ages and thus calibrate the atmospheric models in such a regime. Very few of these objects will fall into Gaia's limits of detection therefore it is of high importance that parallax works continue on such targets as complementary programs of the Gaia mission.
We started a program to measure the trigonometric parallax of 5 such extreme objects recently detected and which constitute excellent prototypes of cool brown dwarfs. Observations started in 2012 at the 4,1 m SOAR/Spartan telescope and will continue until end of 2014. We present a report about the first year of observations treatment.

5. **Francisco J. Galindo Guil**, CAB (CSIC-INTA), Madrid, Spain
Searching for very low stars members of different ages clusters
We are looking for very low-mass members in eleven clusters with ages ranging between 20 Myr to 400 Myr. We have combined deep optical and infrared photometry coming from our own observing runs and from different public databases.
The final goal is to extent membership lists down to the substellar domain and to study the IMF and the mass segregation on different environments.

6. **Federico Marocco**, Hertfordshire University, UK
A spectroscopic census of Brown Dwarfs observed by Gaia - completing the 3D picture.
The ESA cornerstone mission Gaia will revolutionise astronomy observing objects as diverse as minor planets, stars, galaxies out to QSOs and impacting almost all areas of astronomy. We estimate that Gaia will observe directly 500 L0 to L4 dwarfs and a handful of L5 to T1 dwarfs, providing precision of 0.1 - 0.3 mas in parallax for these objects, distances with relative errors of 1-10% and tangential velocities at the level of 10-30 m/s. As these objects are very close, the perspective acceleration will change both the parallax and the proper motion over the time frame of the mission, leading to "astrometric" radial velocities with errors of 10-20 km/s. However, to fully exploit the extremely accurate and precise astrometric data, it is fundamental to obtain better radial velocities. Therefore we aim to obtain a complete, mid-resolution spectroscopic census of all brown dwarfs that will be observed by the Gaia satellite. Here we present the results of our feasibility tests, showing that the wide wavelength coverage and intermediate resolution provided by VLT/X-Shooter is ideal to achieve good precision radial velocities (1-2 km/s) and to determine spectral indices, identify possible unresolved binaries, and further investigate the peculiar objects in the sample. Combined with Gaia results this will be an incomparable dataset for many studies.

7. **Zhaoxiang Qi**, SHAO, Chinese Academy of Science, China
Absolute Proper Motions Outside the Plane
THe APOP Catalog

8. **Bárbara Rojas Ayala**, CAUP, Porto, Portugal
Colour Metallicities for Early M Dwarfs
The metallicity of M dwarf stars provides insights on the enrichment history of the Galaxy, on planet formation, and can aid to the identification of low-mass members of nearby stellar associations. While spectroscopic techniques are preferred to accurately estimate stellar parameters of stars, a larger amount of low-mass stars are accessible with current photometric surveys. We present colour based techniques to estimate the metallicity of early M dwarfs from public available photometric catalogs. The techniques are based on photometry from WISE, UCAC4, and 2MASS surveys and are calibrated with common proper motion systems, consisting on a FGK stars with reliable metallicities and M dwarf companions. Our techniques are qualitatively

validated by synthetic models and by M+M common proper motion systems, and return expected metallicities of young associations/moving groups from kinematically likely low-mass members.

9. **Leigh Smith**, Hertfordshire University, UK
   A Search for New High Proper Motion Objects in the UKIDSS Galactic Plane Survey
   The UKIDSS Galactic Plane Survey (GPS) began in 2005, as a 7 year effort to survey approximately 1800 square degrees of the northern Galactic plane in the J, H, and K passbands. The survey also included a second epoch of K band data with a baseline typically > 2 years for the purpose of investigating variability, this also allows for the measurement of stellar proper motions. We have calculated and visually verified proper motions for 617 high proper motion (> 200 mas/yr) sources from some 900 square degrees of sky, 162 of which are new detections. Among these we have a new spectroscopically confirmed T5 dwarf and a further T6 dwarf candidate, 13 new L dwarf candidates, and several new common proper motion systems containing ultracool dwarf candidates. The high source density in the Galactic plane leads to a high rate of mismatches. Spurious high proper motion detections are common and visual verification is essential as a result. The rate of false positives increases dramatically towards lower Galactic longitudes, we find false detections outnumber genuine high proper motion sources by more than a factor of 5 at $60 < l < 100$. Gaia will vastly improve the accuracy and completeness of proper motion searches in the Galactic plane, though searches in current NIR surveys maintain their usefulness by probing deeper for later type brown dwarfs.

10. **Youfen Wang**, NAO, Chinese Academy of Sciences, China
    Physical properties of ten L/T dwarfs based on their trigonometric parallax
    We have published the derived the trigonometric parallax of five L dwarfs using a robotic telescope. Using the z-band data of the 2 meter robotic Liverpool Telescope, we derived trigonometric parallax of another ten L/T dwarfs. We do kinematics statistic on L/T dwarfs using ours and also the published astrometry data. Beside, we verify their binarity using the proper motion data and the SpT vs absolute magnitude relation. To compare the targets with the brown dwarf model tracks on the color vs absolute magnitude diagram, we test how well the model can predict. Through fitting the optical and NIR observational spectra to brown dwarf model, we get their effective temperature. And this paper will have a taste of what will be possible with Gaia.