A simple and convenient methodology for the synthesis of aliphatic aminonaphthols using the readily accessible 1-acetyl-2-naphthol 6 as precursor was developed (Scheme 3).

Racemic 1-(α-pyrrolidinylbenzyl)-2-naphthol 3a was resolved using inexpensive L- (+)-tartaric acid 11 in acetone through formation of diastereomeric complexes (Scheme 4).
The chiral aminonaphthol $S$-$(+)$-3a was used for the resolution of racemic 1,1$'$-bi-2-naphthol.

We have observed that the readily accessible aminonaphthol 12 is useful for the resolution of racemic ibuprofen 13 and mandelic acid 14. Racemic ibuprofen 13 was resolved in acetone, whereas mandelic acid 14 gave good results in CH$_3$CN solvent (Scheme 5 and 6).
These partially resolved samples were further enriched to obtain samples with 97% ee.

Preparation of (S)-2-diphenylpyrrolidinemethane 16 was carried out in a single step by the reduction of (S)-2-diphenylpyrrolidinemethanol 15 with trifluoroacetic acid and sodium borohydride (Scheme 7).

Various chiral $C_2$ and $C_3$-symmetrical ligands were synthesized using (S)-2-diphenylpyrrolidinemethanol 15 and (S)-2-diphenylpyrrolidinemethane 16 as starting materials (Chart 1 and 2).
Enantioselective acylation of racemic trans-2-phenylcyclohexanol 27 was examined using some of these chiral ligands (Scheme 8).

**Scheme 8**

\[
\begin{align*}
\text{27 (±)} + \text{Ac}_2\text{O} & \quad \text{20 mol% Cat. 26} \quad \text{Et}_3\text{N, CH}_2\text{Cl}_2, -78 ^\circ\text{C, 48 h} \\
\text{27 (±)} + \text{BzCl} & \quad \text{20 mol% Cat. 17} \quad \text{Et}_3\text{N, CH}_2\text{Cl}_2, -78 ^\circ\text{C, 48 h}
\end{align*}
\]

(1\text{R,2S}) 13% ee

(1\text{S,2R}) 8% ee

(1\text{R,2S}) 35% ee

(1\text{S,2R}) 14% ee

The chiral oxazaborolidine catalyst 31 was readily prepared \textit{in situ} at 25 °C in THF using (S)-2-diphenylpyrrolidinemethanol 15 and borane generated from tetrabutylammonium borohydride 30/CH\textsubscript{3}I or I\textsubscript{2} reagent system. The oxazaborolidine 31/BH\textsubscript{3} prepared in this way is useful for the reduction of prochiral ketones 32 to the corresponding alcohols 33 in up to 99% ee (Scheme 9).
A simple *in situ* preparation of (-)-Ipc₂BH 35 was carried using readily accessible tetrabutylammonium borohydride 30/Mel reagent system in combination with (1R,5R)-(+)-α-pinene 34. The use of Ipc₂BH 35 prepared in this way was studied for the hydroboration of *cis*-stilbene 36. Optimum results were obtained when excess (15%) of α-pinene 34 was used to prepare (-)-Ipc₂BH 35 (Scheme 10).
Scheme 10

Hydroboration of α-methylstyrene 42 was studied by activating various chiral amine borane complexes 38-41 (Figure 1) using 0.5 equiv. of iodine (Scheme 11).

Scheme 11

The experimental details are described in the third chapter. The IR, $^1$H NMR, $^{13}$C NMR, mass spectral data, HPLC data and physical constant data (mp) are presented.

Note: Scheme numbers and compound numbers given in this abstract are different from those given in the chapters.